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V. Certain Cultivated Rubi

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V. CERTAIN CULTIVATED RUBI

In preparing a Manual of Cultivated Plants it has been incumbent on me to attempt to refer the cultivated Rubi to their species. My conclusions are so unlike those of authorities on the genus, and also differ so much in some parts from my own earlier studies, that I must explain them at greater length than is possible in the Manual. I have necessarily been taken into a rather extensive review of the genus, and my findings in respect to many American species not subjects of cultivation are incorporated with the rest. Of course it is not my purpose here to monograph the American species or even to include such of them as do not come in my way, nor yet to make an enumeration; nor do I presume to pass any positive judgments on the merits of many of the species currently in dispute. It may not be wholly vain, however, to attempt a running commentary on a good number of the species.

It is none too soon to begin patient botanical studies of the Rubi cultivated in North America, and I hope this paper may stimulate such inquiry. Already the plants are confused because of inadequate attention. The variants and hybrids are many; but great new races will arise for the future cultivator, probably representing combinations of phyla yet little understood. Perplexing as are the difficulties now, they will be vastly greater in years to come unless the steps are recorded in good herbarium specimens and careful diagnoses. Horticultural records are not sufficient: the plants themselves must be permanently represented in preserved material; the usual horticultural notes may miss some of the important characters, and they are likely to lead to opinions rather than to evidence. If good specimens had been made of the early varieties and departures, we should not now be guessing about origins. It is to be regretted that we do not apply to these problems the combined experience of the horticulturist and the exact methods of the systematic botanist. The cultivated races cannot be comprehended without a knowledge of the wild ones; nor, in fact, can the native Rubi be really understood without knowledge of their behavior and distribution under cultivation. We see only half the problem when we attack either side alone.

General Statement

For more than thirty years I have been specially interested in the botanical identity of the cultivated Rubi. In this period I have grown numbers of them obtained in widely separated places. Specimens have been taken freely in the wild and in cultivation. I have given special atten-

tion to the blackberry and dewberry cultivated kinds, since they seem to be little understood botanically and there are many pomological varieties.

These statements are intended only as an explanation of the reasons for the writing of this paper, covering a group of plants commonly considered to lie quite outside the region of usual botanical inquiry, which have been largely taken for granted, and which do not promise definite conclusions. The statements do not imply that the perplexities in the identification of the cultivated plants are all resolved; the paper raises questions rather than settles them.

My first attempt in Rubus was published in The American Garden for November, 1890. At that time I published *Rubus Canadensis* var. *roribaccus;* this was followed by a paper in the same periodical for December, 1890, in which *R. villosus* var. *sativus* and var. *albinus* were published, and a third in February 1891, in which *R. Canadensis* var. *invisus* was proposed. It is to be remembered that then the eastern North American Rubi still lay in their traditional treatment, and these very inadequate articles were near the beginning of the modern segregations.

In November, 1891, I published a bulletin on the dewberries (Bull. 34, Cornell Exp. Sta.) in which the botanical discussion was amplified; and in August, 1895 (Cornell Bull. 99) a similar amplification was made for the blackberries. I had then become convinced that the originally described species had been misunderstood. "I, therefore, laid aside the work of revision of the group", as I wrote in my "Sketch of the Evolution of our Native Fruits", published in 1898, "and, consequently, the publication of this book, until I could personally examine the original specimens. I have now had the opportunity of examining the specimens of Linnæus and Aiton; also those of Willdenow, Link and others at Berlin, and of Michaux at Paris; and through the courtesy of Professor Dr. Beck, I have obtained drawings and full notes of the specimens of Trattinick at Vienna". With the publication of the Sketch, *Rubus canadensis* and *R. villosus* took on new meanings; *R. Enslenii*, *R. argutus* and *R. floridus* were brought definitely and separately into the North American flora; and *R. nigrobaccus* was added.

By this time, the botanical interest in Rubus in North America was becoming active, as part of the new spirit that was invading systematic botany and which has so largely transformed it in recent years. It was apparent that my material and resources were inadequate for a study of the native Rubi, and the native species must be studied before the cultivated kinds can be understood. I therefore held the work in abeyance, although continuing the early interest in the genus specially as to the American cultivated dewberries, blackberries and raspberries. We now have advantage of the collections and studies by Blanchard, Brainerd, Greene, Rydberg, Bicknell, Fernald, and others; and the world mono-

graph of Focke is available. New conceptions of species-segregation have come to the fore. The country is being explored, for it is a fact that the Rubus flora was, and is, imperfectly and insufficiently collected. There has been considerable misapprehension as to species and varieties of my own publication, but I have preferred not to enter the discussion earlier.

In the preparation of this paper I have had the great advantage of access to the collections at the New York Botanical Garden and at the Gray Herbarium, as well as to living plants at Cornell University, New York Experiment Station at Geneva, Ohio Experiment Station at Wooster, North Carolina Experiment Station, and elsewhere, from which herbarium material has been provided. Material at the Royal Botanic Gardens, Kew, England, has been consulted. I am under obligations also to the Missouri Botanical Garden for loan of specimens, as well as to the Botanical Departments of the University of Texas, University of Wyoming, Stanford University. The extensive Indiana collections made by Charles C. Deam have been sent me. Many persons have supplied me with material. Rev. H. J. Riddelsdell, Oxfordshire, England, has provided me with specimens and made valuable suggestions. I had the privilege of purchasing the remaining collections of W. H. Blanchard. My own collection amounts to more than 3000 mounted sheets, representing indigenous, exotic and cultivated Rubi. Of course my material is still inadequate, and the present paper can be considered nothing more than an introduction to the study of the group.

FIG. 62. W. H. BLANCHARD. TAKEN ABOUT 1903 WHEN HE WAS WELL BEGUN IN HIS RUBUS COLLECTING

In the progress of recent Rubus studies in North America, two outstanding events must be recognized in the published work.

One event is the activities of W. H. Blanchard (August 11, 1850 to April 18, 1922. Fig. 62), a Vermont school teacher, who undertook the

collecting of Rubus with arduous zeal. Writing in 1911 (Bull. Torr. Bot. Club, 425) he makes a spirited summary of his travels; he states that the botanists have avoided blackberries and are still doing so, and that he had dropped the popular work and was making a determined, continuous and tireless search in this neglected field. He then proceeds:

"This search has continued and is now ten years old. I have searched throughout the whole of the eastern part of the United States and Canada as far west as blackberries are found, or from St. John's, Newfoundland, to Lake Winnipeg in Manitoba, and south to Florida, missing none of the states or provinces except West Virginia, South Dakota, Nebraska, Texas, Louisiana, Mississippi, and South Carolina, making the search as complete as my time and limited means would allow. I could get little positive information from others when I got to a section, and was obliged to search out everything myself personally and generally alone. Some aid was obtained by visiting herbaria, and all such were visited if Rubus was known or suspected to be found, and botanists were asked for information wherever I went. The information thus gained as to stations for Rubus was of great value, enabling me to learn in hours what otherwise would have taken me days to have learned without it". (Incidentally it may be remarked that as a result of these explorations he said "with confidence, that eight species include the great bulk of our blackberries, perhaps ninety per cent of them". These eight are *R. canadensis*, *R. allegheniensis*, *R. Andrewsianus*, *R. hispidus*, *R. procumbens*, *R. trivialis*, *R. recurvans*, *R. cuneifolius*.)

Blanchard's most intensive work was in the southwestern corner of Maine. Here, according to Bicknell (Bull. Torr. Bot. Club, xxxvii, 394) "a Canadian flora is thrown out along a partly deforested country fronting the ocean shore, which has also received a counter-invasion of the coastwise flora of more southern New England. The condition of compression within this coastal strip may well be supposed to produce a tension between two distinct floras not usually brought into contact, and to place many plants in unaccustomed relations of contiguity. Among plants capable of hybridizing such conditions could scarcely fail to give the opportunity." By this long labor, Blanchard added greatly to the specimens of Rubus in the leading herbaria and he contributed thrity-six new species and five new varieties to our flora in the years 1904 to 1907, mostly in 1906; and in my collection of his material are several names never published.

The second noteworthy event is the effort to account for many of the native Rubi on the basis of stated hybridity. A synopsis of supposed hybrids was published by Bicknell in Bulletin of the Torrey Botanical Club, 1910 (xxxvii, 393-403), and again in 1911 (xxxviii, 103-133). Rydberg elaborated the hypothesis in 1913 in his monograph of Rubus in North American Flora, which is an invaluable assembly of our scattered Rubus records. In 1915

appeared Brainerd's list in the Flora of Vermont (Bull. 187, Vt. Exp. Sta.); and in 1920 came the striking contribution of Brainerd and Peitersen in "Blackberries of New England" (Bull. 217, Vt. Exp. Sta.), with the results of experimental work in which also is the best attempt that had been made to refer pomological varieties to their botanical sources.

In Rubus, particularly in the Eubatus section (comprising the dewberries and blackberries), it is not possible always to apply the formal species-concept of ante-evolutionary days with either precision or satisfaction. In some of the groups, it is doubtful whether specific lines exist. This allows the widest expression of personal opinion, and each succeeding author may solve the problems to his liking. One person may approach the subject with a view to understanding the systematic factors; another may wish to describe all the possible forms. We have not yet gone far in the kind of subdivision that has been exercised in the European Rubus flora; and yet the fact that some 200 binomials and hybridity combinations have been applied to the native plants considered in this paper indicates that the group is not without distinction.

I am convinced that much of the difficulty in identifying the species of Rubus is due to our methods of collecting and to the consequent random material in the herbaria. We take a piece in one place or colony and then other fragments in other places; when these are brought together they may seem to represent different species, whereas all the forms might have been found in the same patch or colony if it had been properly collected. In plants varying so much as Rubus in virgin and fruiting growths, in strong shoots and short shoots, and in small local conditions, it is not enough to take accidental pieces here and there: the colony should be gone over carefully to obtain the range of forms. If the common dewberry were to be collected in this way, probably much of our perplexity would disappear. Our collecting is too casual; in Rubus it should be systematic and thorough.

It is specially important that foliage and stems of the new growth be taken from the same plant as the flowers and fruit. These shoots are the first-year canes or turions; they usually fruit the second year. Sometimes they are called "sterile canes", a term to which Blanchard strongly objects: "It would be as proper to call a chicken a sterile hen or rooster" (American Botanist, vii, 2).

In making the identifications, I accept the species-and-variety concept. I know of no other way by which rank can be so well expressed. Many of the forms are not coordinate with species; if these forms are all merged in the species without distinction, then we eliminate or cover up many of the facts; if we designate the lesser forms as species, then we break down specific lines because we cannot differentiate clearly and we give major importance to minor facts. I have not been able to follow certain writers

in adopting full binomials for forms that are classed by the authors themselves as subordinate to species. Thus Sudre, in his notable Rubi Europæ, makes *R. vulgaris*, Wh. & N. a full species ("espèces les plus tranchées"), but ranges under it and subordinate to it six other plants all bearing full binomials and of different ranks; how these six binomials are to be used accurately in nomenclature I do not know: they cannot be cited as subspecies or varieties because the combinations have not been made; they cannot be cited as full binomials without violating the author's subordination. "Use of a binary nomenclature for sub-divisions of species is not admissable", according to Article 28 of the International Rules. It could not be admissable without inviting confusion. A systematic treatment must always consider the necessities of a practical nomenclature: the treatment should never force the student to use an inaccurate nomenclature.

In this paper I have not assumed hybridity to account for doubtful or apparently intermediate forms except in those few cases in which we have dependable records or experience. On the subject of hybrid forms in our wild Rubi I take no position. For purposes of identification I have felt that the facts may be expressed in other ways. In the study of many kinds of plants I have come to feel that we too easily invoke hybridity as a cover for difficulties.

Recent studies of hybridity have quite disproved intermediateness as a proof of double parentage. Some of the hand crosses in Rubus give unpredictable results. The study of hybridity is a biological quest of another kind, and its results may not aid identification and they are not necessarily to be incorporated in nomenclature. Even when we demonstrate a hybrid origin, we may need a binomial to designate the plants if they represent a marked coherent group of considerable distribution that reproduces itself with substantial uniformity.

Hybridity is yet too little understood, even under conditions of control, to enable us very definitely to express its results in the names of plants. It is commonly assumed that when progeny is essentially invariable the case is not one of double parentage; so that we doubt the supposed hybridity of a plant when its seedlings closely and uniformly resemble itself. The recent cytological and experimental studies of Täckholm*, however, show that apogamous reproduction may take place; this may throw much new light on some of our puzzling cases.

There are great practical difficulties in the making of a nomenclature for hybrids. We are in danger of assuming relationships that may not exist. Before we can safely postulate hybridity, we must be sure that

*Gunnar Täckholm, Zytologische Studien über die Gattung Rosa, in Acta Horti Bergiani, vii. Upsala, 1923. Note particularly Part 2, "Ueber die apomiktische Fortpflanzung der Caninæ-Rosen", page 264.

we have made a proper definition of the species themselves. The question cannot be settled in the herbarium. The quest for hybrid origins is of course to be encouraged and all the attempts in this direction are so much to the good; but we should be careful not to confuse hybridity with nomenclature. The reader will understand that in this paper I am concerned, as I have said, with identification and nomenclature, not necessarily with the biological question of origins.*

As I am here occupied primarily with the placement of horticultural things, I must rely on diagnoses rather than on range to separate the species, inasmuch as the element of habitat is largely eliminated from the study of cultivated plants. This may lead to a rather broader conception of species than is now prevalent.

If a group of plants is a clear entity in nature, it must of course be named and distinguished, however close the relationships may be; but when we have a case of finding differences where there are no natural lines of demarcation, then the divisions should not be narrow because they serve no useful purpose and they limit the study of the plants to a few close specialists and these specialists probably all disagree. It is a misfortune when a great mutation-group becomes so minutely split that botanists in general pass it by as beyond their understanding and when collectors cease to be interested in it. In such groups, it is seldom that little arbitrary marks are reliable differentia of species. In any variable group of plants it is possible, by curious diligence, to find sets of interesting differences, and when the process of minute subdivision is once begun it is usually necessary to carry it very far; but it is a fair question whether all of these differences should be expressed in binomial nomenclature.

We are to recognize two kinds of species-making in Rubus. One is the process of breaking up the different species after a country is thoroughly collected. The other is the adding of new species when the country is being explored. In North America, the Rubus flora is not yet collected.

The remainder of the paper divides itself into two parts: 1. Various cultivated species aside from Eubatus, page 146. 2. The forms of Eubatus cultivated in North America, page 152. It is in the second group that the particular trouble lies.

*This question is discussed in the Brassica paper, Gent. Herb. fasc. ii, p. 55.

PART I. VARIOUS CULTIVATED RUBI ASIDE FROM EUBATUS

The leading species here considered are grown for the edible fruits; they are the raspberries. A few are minor ornamental plants.

A. *Fruiting stems annual, arising each year from the crown and perishing in autumn: grown somewhat for the fruit.*

1. **Rubus xanthocarpus,** Bureau & Franchet in Moret Journ. Bot. v, 46 (1891).

A small species producing a bright yellow fragrant fruit somewhat like a raspberry; little grown. China.

AA. *Fruiting stems or canes biennial or perennial (except in No. 13): various species grown for the edible fruit and others for ornament.*

B. *Plant spineless.*

2. **Rubus deliciosus,** Torr. Ann. N. Y. Lyc. ii, 196 (1827).
R. Roezli, Regel, Gartenflora, xxiv, 227 (1875).
Bossekia deliciosa, Nels., in Coult. & Nels. Manual, 250 (1909).
Oreobatus deliciosus, Rydb. Bull. Torr. Bot. Club, xxx, 275 (1903).

The Rocky Mountain Flowering Raspberry, native in the high mountains of Colorado, is an attractive shrub with a profusion of large white fragrant rose-like flowers, hardy in the northern states.

3. **Rubus odoratus,** L. Sp. Pl. 494 (1753).
Bosseckia odorata, Greene, Leaflets i, 211 (1906).
Rubacer odoratum, Rydb. Bull. Torr. Bot. Club, xxx, 274 (1903).

The Eastern Flowering Raspberry has long been in cultivation in this country and abroad for its good foliage and large rose-purple flowers. Var. **albidus,** Bailey, Stand. Cyclo. Hort. 3024 (1916) has whitish flowers and lighter colored bark.

4. **Rubus parviflorus,** Nutt, Gen. i, 308 (1818).
R. nutkanus, Moc. in DC. Prodr. ii, 566 (1825).
R. nutkanus var. *Nuttallii,* Torr. & Gray, Fl. N. Amer. i, 450 (1840).
R. nutkanus var. *parviflorus,* Focke, Bibl. Bot. heft 72[II] 124 (1911).
Bossekia parviflora, Greene, Leaflets i, 211 (1906).
Rubacer parviflorum, Rydb. Bull. Torr. Bot. Club, xxx, 274 (1903).

This white-flowered species, inappropriately carrying the name *R. parviflorus,* ranging from northern Michigan to Mexico and Alaska, the western representative of *R. odoratus,* is more or less known in cultivation. A handsome departure is var. **Fraserianus,** J. K. Henry, Torreya, xviii, 54 (1918), with petals laciniate-dentate on the lower half; named after George Fraser, Ucluelet, British Columbia, who has given much attention to Rubus. *R. nutkanus* forma *lacera,* O. Kuntze, Meth. Spez. u. Rubus, 102 (1879) is a form in which "die grossen Blätter sind tief geschlitzt". Another entry is "*R. nutkanus,* Moc. . . . andert selten: R. *lacer,* O. Kuntze; Blütenstand subsessil, Blätter geschlitzt".

A cross of *R. parviflorus* with pollen of *R. odoratus* by George Fraser, Ucluelet, is described in Gardeners' Chronicle, January 27, 1923 (p. 51, fig. 24) under the name *R. robustus.* The pollen was sent from New York. It is a robust floriferous plant, reaching eight feet. "The flowers are a very pleasant rose color at opening, and fade to pale purple; they are fragrant, but not more so than those of *R. nutkanus*".

BB. *Plant variously spiny or prickly.*
C. *Leaves simple, variously lobed.*

5. **Rubus palmatus,** Thunb. Fl. Jap. 217 (1784).

A floriferous ornamental bush of China and Japan, interesting as parent of the Mayberry introduced by Luther Burbank for its edible fruit. The Mayberry appears

not to have held in cultivation here. *R. microphyllus*, L. f. Syst. Veg. 263 (1781) is said to be a juvenile stage of this plant; if this is the case, the name must displace *R. palmatus* even though inappropriate.

6. **Rubus cratægifolius,** Bunge, Mem. Sav. Etr. Petersb. ii, 98 (1835).

A hardy invading species of China and Japan, infrequently planted for ornament and the holding of rough banks, specially useful for the latter purpose.

CC. *Leaves on fruiting shoots or canes prevailingly 3-foliolate, the leaflets broad and on the ovate order (often 5-foliolate on virgin canes).*
D. *Flowers large, like small single roses, solitary or only 2-4 together.*

7. **Rubus spectabilis,** Pursh, Fl. Amer. Sept. 348 (1814).
Parmena spectabilis Greene, Leaflets, i, 244 (1906).

The Salmonberry, native Idaho to California and northward to Alaska, has been more or less planted for ornament; the salmon-colored or reddish fruit is also edible.

DD. *Flowers mostly small and not individually showy, in racemes or panicles.*
E. *Canes and petioles beset with reddish or orange setose hairs, in No. 9 more or less glandular.*

8. **Rubus ellipticus,** Smith in Rees Cyclo. xxx, Rubus no. 16 (1815).
R. flavus, Hamilt. in Don Prodr. Fl. Nepal. 234 (1825).

A very strong covering vine-like species with thick evergreen foliage; grown for ornament in Southern Florida and California, sometimes as the Golden Evergreen raspberry and *Rubus aurantiacus;* naturalized in Jamaica and persistent in Bermuda; native in the Himalayan region, running into several forms.

9. **Rubus phœnicolasius,** Maxim., Bull. Acad. St. Petersb. xvii, 160 (1872).

Advertized in this country in 1890 by John Lewis Childs as the Wineberry, from seeds obtained in Japan in 1887 by C. C. Georgeson and sent to J. T. Lovett, Little Silver, New Jersey. The plant was recommended for its edible fruit, but is now known mostly as an ornamental; it is somewhat escaped in the United States. The species is native in China and Japan.

EE. *Canes and petioles not at all or not prominently red-hairy.*
F. *Fruits in close corymb-like clusters, commonly black; leaves on new canes pedate when 5-foliolate: plants propagating by "tips".*

10 **Rubus occidentalis,** L. Sp. Pl. 493 (1753).
Melanobatus occidentalis, Greene, Leaflets, 1, 243 (1906).

The Blackcap raspberry is wild from New Brunswick to Minnesota and Colorado and south to the mountains of Georgia. It is not a variable species, as Rubi go, and the pomological varieties are very much alike. Focke admits only two subdivisions, both "var. vel subspec.", one of which is *R. leucodermis*, Dougl., now commonly regarded as a distinct species, the other separated by Rydberg as *R. Pringlei.*

Pomological varieties include Abundance, Black Pearl, Cumberland, Diamond, Doolittle, Gregg, Hoosier, Joshnson, Kansas, Mid West, New Logan, Ohio, Plum Farmer, Souhegan, Stone Fort, Winfield. Var. **pallidus,** Bailey, Cyclo. Amer. Hort. 1582 (1902), Var. *flavobaccus*, Blanch. Rhodora, vii, 146 (1905), fruit amber-yellow; sometimes occurs in the wild, and known in cultivation.

Of *Rubus occidentalis* in the Linnean Herbarium there are two sheets. One is our blackcap raspberry, collected by Kalm; Linnæus apparently described the species from Kalm's material, but the sheet does not bear his handwriting; on the sheet, J. F. Smith has written "occidentalis verus H[erb.] B[anksianus]." The other sheet is written "2 occidentalis", in Linnæus' hand, the figure 2 being the entry in Species Plantarum; the

plant is not the blackcap, however; on the sheet Smith has written "saxatilis Pursh? or obovalis?", and A. G[ray] has written "an caesius?". It appears that Linnæus wrote up the wrong sheet; but the Kalm plant and the original citation and description may be held to represent the species he intended.

FF. *Fruits in more or less elongated racemelike clusters, commonly red: leaves on new canes pinnate when 5-foliolate: plants propagating by suckers* (excepti on in No. 12).

11. **Rubus idæus,** L. Sp. Pl. 492 (1753).

The Red raspberries are best understood by regarding them as representing a single north temperate species encircling the globe. It has been customary for horticulturists to separate the American forms as *R. strigosus,* but this species has no homogeneity within itself; and Fernald has recently shown (Rhodora, xxi, 89–98. 1919) that the typical *R. idæus,* supposed to be Eurasian, is native in parts of North America. Without knowing the nativity, it is often impossible to refer a given specimen definitely to *R. idæus* or to *R. strigosus*; and the horticulturist is confronted with this phase of the problem in much of the material he handles. A certain pomological group or family of red raspberries, represented for example by the Antwerps, is commonly held to be European and referred to *R. idæus* and we have a fairly clear history. On others there are differences of opinion as to the botanical identity, and probably we never can settle the point in some of them unless we can determine their horticultural history,—find out where they or their parents really came from. Maximowicz considers the circumpolar species to be one, with geographical varieties. The same general view is held by Focke.

A similar reversionary form occurs in both Europe and North America. In America it is *R. idæus* var. *Egglestonii,* Fernald, Rhodora xxi, 97 (*Rubus Egglestonii,* Blanch. Torreya, vii, 140 (1907). It has been found only in Vermont. This is the equivalent of the European *R. idæus* var. *anomalus,* Arrhen. (*R. obtusifolius,* Willd).

The botanical differences between *R. idæus* and *R. strigosus* are slight. Fernald makes the key characters of separation as follows:

R. idæus types: Inflorescence without glands or minute bristles: prickles of the new canes(when present) strong and obviously broadened at base.

R. strigosus types: Inflorescence bearing glands and minute bristles: new canes (with certain exceptions) bearing slender bristles and often stipitate glands.

To the horticulturist, these characters hold more or less and also others that appeal to the cultivator: the European varieties are more tender and the growth usually more close or strict, the canes stout and with less "bloom"; the leaves are usually thicker and flower-clusters more compact; the fruit is darker red, with white and yellow kinds fairly common. The characters are inconstant, however, and often difficult to make out. For many years I have tried to keep the two plants specifically distinct, but I am now inclined to let the horticultural forms follow the treatment of Fernald for the native forms; this unites the red raspberries into one circumpolar species.

Under this disposition, Red Antwerp, Syracuse, Fastolf, of the pomological varieties, apparently represent *R. idæus* itself, and there are probably others. Most of the American pomological red raspberries are undoubtedly descended from native stock, although inasmuch as the European raspberry was early introduced by colonists and as the current varieties are of relatively recent origin, it is not unlikely that some of the named kinds are of mixed parentage.

The American *R. idæus* runs into several botanical races, variously intergrading. The main botanical varieties of the eastern half of the country are three:

a. New canes pubescent or somewhat tomentose beneath the bristles.

R. idæus var. **canadensis,** Richardson, Append. ed. 2, in Franklin Journ, ed. 1, 747 (1823).

R. carolinianus, Rydb. N. Amer. Fl. xxii, 447 (1913).
R. subarcticus, Rydb. l.c. 448.

I have not seen pomological kinds referable to this variety, although the plant ranges from Labrador to Alaska to North Carolina and Colorado.

aa. New canes glabrous, sometimes glaucous, beneath the bristles.

b. Prickles usually strong, broadened at base.

R. idæus var. **aculeatissimus,** Regel & Tiling, Fl. Ajan. 87 (1858).
R. melanolasius, Focke, Abh. Nat. Ver. Bremen, xiii, 469 (1896), and later considered by Focke as a subspecies of *R. idæus.*

I have not seen garden raspberries of this variety. It ranges from Michigan to western North America and eastern Asia.

bb. Prickles bristle-like, sometimes wanting.

R. idæus var. **strigosus,** Maxim. Bull. Acad. St. Petersb. xvii, 161 (1872).
R. strigosus, Michx. Fl. Bor. Am. i, 297 (1803).

The prevailing red raspberry of North America, extending to eastern Asia. To this variety belong many pomological red and yellow American raspberries of which I have specimens, as Brighton, Brilliant, Buckeye, Count, Cuthbert, Donboro, Eaton (Alton, Idaho), Empire, Erskine Park, Golden Queen, Herbert, June, King, Loudon, Marlative, Marlboro, Marldon, Minnetonka, Ohta, Ontario, Perfection, Ranere (St. Regis), Red Rose, Ruby, Sunbeam, Turner, Twentieth Century, Wardell, Welch.

12. **Rubus neglectus,** Peck, Ann. Rep. N. Y. State Cab. xxii, 53 (1869).
Melanobatus neglectus, Greene, Leaflets, i, 243 (1906).

The Purple raspberries (or Purple-canes) are hybrids between *R. occcidentalis* and *R. idæus* var. *strigosus.* They constitute a various group, now resembling one parent then resembling the other. They propagate either by tips or suckers. The 5-foliolate leaves on new canes may be either pedate or pinnate or perhaps oftenest imperfectly pinnate. The fruits are usually closely aggregated at the top of the shoot, but the cluster is straggly below. The berries are purplish to dull yellow and dull red, large and juicy, holding their shape well. The hybrid occurs in the wild. In cultivation it comprises such pomological varieties as Cardinal, Caroline, Columbian, Haymaker, Royal Purple, Shafer, Walton. This hybrid group is so indefinite and variable that it is hardly worth while to retain *R. neglectus* as a botanical name.

CCC. *Leaves pinnate, usually with 5-7 long narrow leaflets on the long-lanceolate order.*
D. *Calyx-lobes long-caudate, usually much exceeding the petals.*

13. **Rubus illecebrosus,** Focke, Abh. Nat. Ver. Bremen, xvi, 278 (1899).

The Strawberry-raspberry, formerly confused with the tropical *R. rosæfolius,* is root-hardy in New York but the canes usually winterkill; it throws up vigorous shoots that fruit the same year, or the canes may be annual. The flowers are large, white, solitary or two or three together; fruit rather large, bright scarlet, agreeable when cooked. It is frequent as an ornamental plant. The species is native in Japan.

14. **Rubus rosæfolius,** Smith, Plant Ic. Hact. Ined. t. 60 (1791).

A vigorous evergreen species, native in southern and eastern Asia, but now widely naturalized in tropical countries and often passing as a native. In Porto Rico it is completely established. In the Aibonito district the fruit is gathered by children and sold to travelers along the Military Road. The fuit is bright red and attractive, although not of high quality.

R. rosæfolius var. **coronarius,** Sims, Bot. Mag. t. 1783.
R. coronarius, Sweet, Hort. Brit. 144 (1826).

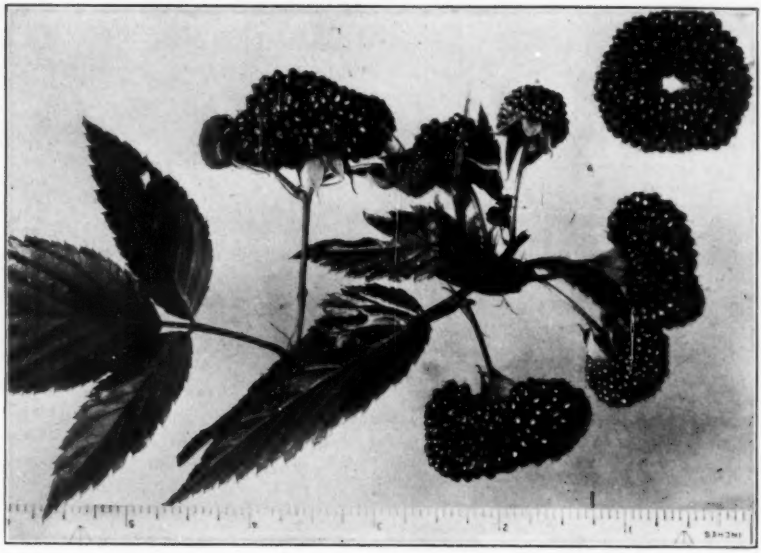

FIG. 63. FRUITING PIECE OF *Rubus probus*, GROWN IN PORTO RICO.

The Briar Rose and Bridal Rose is a double-flowered form of *R. rosæfolius*. It is an attractive plant seen now and then in tropical gardens and sometimes grown under glass.

DD. *Calyx-lobes short, acute but not caudate nor much if any exceeding the petals.*

†15. **Rubus probus,** spec. vel cultg. nov.*

Affinis *R. rosæfolio*, sed differt glabritie petiolorum et laminarum pedicellorumque. et ut videtur minus aculeatus: foliola 3 ad 9, plerumque 7, et pro rata multo latiora, in ramulis brevibus fructiferis, ovato-lanceolata ad fere ovata, margine profundius et agutius serrata, venis magis prominentibus: flores magni, aggregati; calycis lobi acuti vel breviter cuspidata, sed non caudata, petala paullo vel non superantes: fructus ruber, depressus et itaque aplanatus videtur, annuli forma a receptaculo solutus. Planta erecta, 2-2½m. alta; turiones non perennantes, leviter curvati, sed non scandentes: in turionibus robustis folia 20-25 cm. longa, foliolis 10 cm. longis.

This is a cultivated plant in Porto Rico, whence I have received material. It has been grown in the Island for some years and there is a picture of it, without text, in the Annual Report for 1912 of the Porto Rico Agricultural Experiment Station; Fig. 63 is reproduced from the same photograph. It is related to *R. rosæfolius:* differs in being glabrous on petioles, leaf-blades and pedicels, apparently less thorny: leaflets 3 to 9 but usually 7 and relatively much broader, ovate-lanceolate to nearly ovate on short fruiting branches, margins more deeply and sharply doubly serrate, veins very prominent:

**Cultigens nova.* Cultigen is a plant, group or series known only in cultivation and presumably originating under domestication; it has no nativity; used in contrast with *indigen*. See Bailey, Science n. s. xlvii, 306 (1918): also Gent. Herb. fasc. 3, p. 113.

New names or transfers are marked with a dagger (†).

flowers more clustered; calyx-lobes acute to short-cuspidate but not caudate, little if at all exceeding the petals; fruit red, seedy, depressed endwise so that it has a flattened appearance, detaching from the receptacle in the form of a ring. Plant upright, about 8 ft. high; canes not perennial, somewhat bending but not climbing; leaves 8-10 in. long on vigorous growths, and leaflets to 4 in. long.

This Rubus is probably from Queensland, and I suppose it to be of the stock originating with James Pink, Brisbane, as a reported cross between a variety received from Japan under the name of *Rubus ellipticus* and *Rubus rosæfolius*, the latter being the pistillate parent. In the plant grown in Porto Rico I am not able to identify characters of *Rubus ellipticus*. The Queensland plant was introduced in this country by means of seeds, and the Porto Rico stock (if it is of that introduction) is at least a second-generation cross. It would be interesting to know what dominances are now apparent in Porto Rico, if our plant is in fact the Queensland raspberry, and, also, whether the plant grown in Queensland is a first-generation hybrid multiplied asexually and has a different character from ours.

PART II. THE FORMS OF EUBATUS CULTIVATED IN NORTH AMERICA

We come now to the dewberries and blackberries,—woody mostly spine-bearing plants with commonly biennial canes (except in the introduced species), creeping, prostrate, decumbent or erect, usually 3-foliolate leaves or 5-foliolate on turions, the drupelets adhering to the receptacle which separates from the pedicel. In the only complete American treatment, that by Rydberg in North America Flora, xxii, part 5 (1913), forty-one species are admitted in the region north of Mexico, as also many hybrids: and since the publication of that work other species have been described. The larger part of these species must be appraised if we are to make an enumeration of the cultivated kinds. Certain cultivated forms are from Old World sources, and these must be added to the account.

The Eubati (dewberries and blackberries) are notoriously difficult to distinguish as they have been divided and subdivided in Europe, and the North American species are probably equally perplexing if similarly divided. The difficulties with the American species, at least, are at once clarified by the adoption of the Group or Associates method whereby the outstanding species are separated and the others assembled about them, provided of course the method does not project itself in nomenclature (as of species, minor species, subspecies, varieties, subvarieties, and other grades of subordination). In North America there are one less than a dozen historic species about which all the others may be grouped; and these eleven apparently represent real feral generalized types rather than hybrids or dubious forms or geographical variants. In making these groupings, we do not assume that the older species are "better" than the newer or that one is to be subordinated to another, nor do we attempt to make a key to all the species; we are merely employing the tested practice of the association of ideas, and this should enable us to make a more harmonious commentary.

The eleven, in the order in which they are placed in this commentary, are *R. vitifolius*, *R. flagellaris*, *R. trivialis*, *R. hispidus*, *R. setosus*, *R. cuneifolius*, *R. canadensis*, *R. allegheniensis*, *R. argutus*, *R. frondosus*, *R. floridus*.

These eleven species group themselves into dewberries and blackberries, and thence into minor assemblages. The schema is briefly as follows (a fuller analysis is developed in the subsequent pages):

The dewberries.
- Plant prickly.
  - Canes pruinose: *Vitifolius*.
  - Canes not pruinose.
    - Leaflets of turions broad and mostly large, deciduous: *Flagellaris*.
    - Leaflets of turions narrow, often persistent: *Trivialis*.
- Plant hispid: *Hispidus*.

The blackberries.
- Plant hispid: *Setosus*.
- Plant not hispid.
  - Foliage white or gray beneath: *Cuneifolius*.
  - Foliage not so.
    - Canes unarmed: *Canadensis*.
    - Canes armed.
      - Inflorescence elongated, glandular: *Allegheniensis*.
      - Inflorescence otherwise, short, often foliaceous.
        - Leaves of flowering shoots characteristically acuminate or acute.
          - Leaflets narrow: inflorescence not leafy: *Argutus*.
          - Leaflets broad: inflorescence manifestly leafy: *Frondosus*.
        - Leaves of flowering shoots short and essentially obtuse or even rounded: *Floridus*.

A. *The dewberries,—plants creeping or prostrate, in cultivation sometimes trained on trellises, rooting at the nodes or at the tips of the turions: inflorescence short, typically of 1 or few flowers in a forking more or less indefinite arrangement.* (AA page 175).

There is no clear botanical line of separation between the dewberries and high-bush or standing blackberries, but they constitute a well-known cultural group. The pomological dewberries represent but few of the trailing species, yet the whole group may be catalogued together for a better understanding of the affinities.

Of the score or so of names in this group, half are historic rather than contemporaneous, that is, they represent the foundations of the older authors. These we must clearly understand.

B. *Plant with evident and usually strong prickles, and sometimes also bristly.* (BB page 173).

C. *Canes very pruinose or glaucous: flowers bisexual: fruit of few large glaucous distinct drupelets.*

16. **Rubus cæsius,** L. Sp. Pl. 493 (1753).

The European dewberry has been introduced as a ground cover. It has become established and is spreading at Ithaca, New York, and is to be expected as an escape elsewhere. The plant known to landscape planters as *R. dumetorum* belongs here. It is known by its canes glaucous like those of *R. occidentalis*, at first more or less erect but soon decumbent and long-trailing, rooting freely, making a profuse covering for banks and fills: prickles many, weak and rather short: leaves usually 3-foliolate, the leaflets thinnish, broad-ovate, finely double-serrate and often somewhat lobed, pubescent beneath: flowers rather large, few on prickly pedicels, in a short cyme: fruit of a few large glaucous-blue separate drupelets.

VITIFOLII

CC. *Canes more or less pruinose: stems often ascending a few feet and then long trailing canes: flowers for the most part unisexual: fruit of many compacted drupelets: far western species, rooting at the tips of canes.* (CCC p. 157).

Here fall the dewberries of the Pacific region and east to Idaho. Three historic species have been made in them, *R. vitifolius* and *R. ursinus*, Cham. & Schlecht., and *R. macropetalus*, Dougl., the last described and figured from a staminate plant. The specific lines are not understood, and they cannot be determined from the random material in herbaria. They must be worked out by careful consecutive observation and collection. There are marked differences in the herbarium material, if it has considerable range, but what the systematic value of these dissimilarities may be does not yet appear. Some persons prefer to regard the entire range as one species; others would recognize four or five species. We may briefly analyze the characters supposed to separate these species, largely following Rydberg, and this will be sufficient for the placing of the cultivated kinds.

Two marked offshoots of this group are in cultivation, (1) the Loganberry and Phenomenal type, (2) the Mammoth. Aside from these departures, certain varieties little modified from wild species have been introduced.

a. Flowers prevailingly unisexual or one sex little developed (plants subdiœcious): leaves on turions 3-foliolate or less, or pedate.
  b. Fruit pubescent or pilose.
    c. Stems puberulent or pilose: leaves not tomentose but only sparingly pubescent both sides, those on turions mostly 3-foliolate.
      d. Leaves green on both surfaces: inflorescence little if at all glandular: fruit much longer than broad. *R. vitifolius*
      dd. Leaves lighter colored beneath: inflorescence densely glandular: fruit slightly if at all longer than broad. *R. Helleri*
    cc. Stems densely pubescent: leaves also densely pubescent beneath, when young almost tomentose, those on turions often simple. *R. ursinus*

bb. Fruit glabrous.
c. Terminal leaflet broad-ovate, rounded or cordate at base, with deep lanceolate teeth: fruit slightly longer than broad. *R. macropetalus*
cc. Terminal leaflet mostly rhombic-ovate, acutish at both ends, the teeth broad and short: fruit twice as long as broad. *R. Eastwoodianus*
aa. Flowers bisexual and apparently perfect: leaves on turions often pinnately 5-foliolate. *R. loganobaccus*

17. **Rubus vitifolius,** Cham & Schlecht. Linnæa, ii, 10 (1827).
R. ursinus var. *vitifolus*, Focke, Bibl. Bot. heft. 83[1], 79 (1914).

The species was founded on San Francisco material: "Ad San Francisco Californiæ reperimus": "Specimen possidemus unicum, rami scilicet floriferi partem superiorem, apicalem, octopollicarem". From such material a full diagnosis could not be drawn; but it is not a tomentose plant and the leaves are noted as 3-lobed rather than compound; both stamens and pistils are included: "calycis laciniae semipollicares, longiores quam petala obovata basi attenuata, quae longitudine staminum filiformium. Germina villosa, styli glabri". Fruit is not mentioned. Rydberg considers the species to be Californian, but it apparently occurs also in Oregon.

I have not been able to identify any of the named cultivated dewberries with this species as here understood, although I suppose that the Aughinbaugh, once considerably planted in California, belongs here (or possibly to *R. ursinus*).

18. **Rubus Helleri,** Rydb. N. Amer. Fl. xxii, 460 (1913).

Stems sparingly pilose becoming glabrous, with very small and weak straight prickles: leaves of fruiting branches ternate; leaflets thin, pale beneath, sparingly short-hirsute both surfaces, coarsely double-serrate, the terminal one broad-ovate or cordate: flowers few together, the pedicels and calyx finely pilose and glandular: fruit ovoid, black, finely pilose. British Columbia to Oregon west of the Cascades, according to Rydberg.

I have not seen it in cultivation.

19. **Rubus ursinus,** Cham. & Schlecht. Linnæa, ii, 11 (1827).

Founded on material "In dumetis ad sinum St. Francisci Californiae novae una cum R. vitifolio legimus". Nothing is said as to the affinity of this plant with *R. vitifolius* but rather, "An R. fruticoso, an potius R. idaeo affinis?". It must have looked very distinct. The stems are described as tomentose, leaves "(ramorum fertilium) simplicibus ternatisque" and incano-tomentose beneath, leaflets ovate and the middle one subcordate sublobate. Fruit was not seen. Rydberg restricts the species to California.

I have not seen this tomentose plant in cultivation.

20. **Rubus macropetalus,** Dougl. apud Hook Fl. Bor. Amer. i, 178 (1832).

Described as from "banks of rivers and in low woods, in the Valley of the Columbia, North-West America". It was therefore considered to be a widespread species. The stems are described as more or less pilose: leaves 3-foliolate, sparsely appressed-hirsute; leaflets ovate, cut-lobed: peduncles 2-flowered, the large petals white and sepals long-acuminate: the fruit is given, quoting Douglas, as "oblongus ater". Two leaf-forms are mentioned, one with leaflets acute and one with leaflets obtuse. The diagnosis is accompanied by a good plate. Rydberg considers its range to be British Columbia to Idaho and northern California.

To this species, as here understood, I refer the horticultural varieties Belle of Washington, Skagit Chief, Washington Climbing.

21. **Rubus Eastwoodianus,** Rydb. N. Amer. Fl. xxii, 460 (1913).

Collected on Mt. Tamalpais, near San Francisco, by Rydberg in 1905, and considered by him to be central Californian. Sparingly hirsute and soon glabrous, with few slender small straight prickles: leaves ternate on the turions, and on fruiting branches

ternate or unifoliate, thin, green both sides, almost glabrous beneath but sparingly short-hirsute above: fruit long.

I know of no cultivated varieties.

†22. **Rubus loganobaccus,** cultg. nov. LOGANBERRY.' PHENOMENAL.

Supposedly a hybrid between the native California dewberry and a red raspberry. A plant of great vigor, propagating by "tips", with persistent heavily pubescent or tomentose foliage of the *R. ursinus* type, leaves on strong turions commonly 5-pinnate, bisexual or perfect very large flowers on stout very prickly pedicels and with large pointed reflexing sepals, and long very large pilose red acid fruits, the drupelets adhering to the receptacle as in the usual dewberries and blackberries. The loganberry has come to be one of the major small-fruits. The berries, prepared in various ways, are a regular article of commerce in the United States.

The origin of the loganberry follows, as sent me by Judge J. H. Logan, Santa Cruz, California, in 1902:

"In August, 1881, I planted the seed of the common wild blackberry or dewberry, of California, botanically known as the *Rubus ursinus*, gathered from plants on one side of which was growing a kind of evergreen blackberry known as the Texas Early, and on the other side of which was growing an old variety of red raspberry. The Texas Early has a growth of cane and leaves similar to the Lawton, although much less vigorous, and in our mild climate is growing winter and summer. It has a small round berry of more acidity than the Lawton and probably of poorer flavor. The raspberry referred to has been growing in this place for the last forty years and I am unable to ascertain what variety it is, although it is of a type similar to the Red Antwerp. It is not, however, the Red Antwerp as we have been growing it here. From this seed there grew about one hundred plants which were cared for and planted out in the ground. In the summer of 1883 these plants fruited and there appeared one plant which was undoubtedly a cross between the raspberry and the *Rubus ursinus*. The fruit was larger and earlier than the raspberry or any blackberry, except the *R. ursinus*, ripening about the middle of May; the appearance of the berry on the surface was something like the raspberry, being less indented and of more even surface than a blackberry; the color a bright glowing red, becoming very dark and finally, when dead ripe, of a dull purplish-red color. The berry has a core like the blackberry and parts from the calyx the same as a blackberry. The leaves of the vine are almost identical with the wild Rubus, being somewhat larger. The canes are also like the wild Rubus only larger and more vigorous. It has the same small sharp spines, and like it, is without adventitious root buds, but multiplies from the stolons or tips and from seed. The fruit, when cooked, has the same rich acidity as the wild Rubus, there being only a suggestion of the taste of the raspberry in the cooked fruit, but in the jelly there is a more decided raspberry flavor. This red berry is universally known here as the Loganberry."

There has been much discussion as to whether the loganberry is really a hybrid or only a direct offshoot from the wild dewberry (blackberry) of California, with the weight of speculation and discussion strongly favoring the latter position. As no one seems to be confident whether the California wild dewberry is one species or more, we are left without a clear binomial for the plant. No one may yet say what the loganberry is, but it represents a dominating race and one that cannot be referred to any of the wild Pacific dewberries or blackberries without considerably enlarging the diagnoses of them and perhaps beyond the probabilities of their natural variation.

I am strongly inclined to the opinion that the loganberry is a hybrid, as supposed in the beginning. The herbarium material looks very distinct. The frequent presence of five large leaflets, pinnately placed, on the young canes suggests *R. idæus*. In only one case have I seen more than three leaflets on the many specimens I have examined of the native Pacific coast species and in this case the leaflets are pedate; the collector, Charles Howard Shinn, writes (Madera Co., Calif.) that on looking over the patch carefully he finds about as many canes with five leaflets as with three and those with five are the more vigorous. Jepson (Fl. West. Middle Calif. ed. 2, 207) writes "pinnately 3 to 5-foliolate", and Focke (Bibl. Bot. heft 83^1, 78) says "folia ternata, vulgo nonnullis

pinnato-quinatis intermixtis". It is to be determined how characteristic the five leaflets are in the wild plants, whether the lower pair is distinctly pinnately placed or only pedate, and whether the foliage is really that of the loganberry. At one time I had the privilege of going over the loganberry material growing at Kew with the late R. A. Rolfe, who was keen on Rubus; he contended it is a hybrid, an opinion that I thought had much weight in view of his experience with Rubus problems in Europe. The prevailing argument against the hybridity hypothesis is the fact that the loganberry breeds practically true from seed; but subsequent investigation may modify our estimate of this fact (cf. the note on the Täckholm studies, page 144). Evidence as to parentage of the loganberry must include careful field study of the native Pacific Rubi.

Collateral evidence as to the probable hybrid origin of the loganberry is afforded by the Phenomenal which Luther Burbank records (Methods and Discoveries, vi, 62) as a "second-generation offspring of the Cuthbert raspberry and the California dewberry". The Phenomenal, while a different horticultural variety from the loganberry, nevertheless has similar botanical characteristics, so much so that I include it in the cultigen *Rubus loganobaccus*.

Loganberry and Phenomenal become willing parents of crosses. The loganberry is one of the parents of the English Lowberry and the Laxtonberry; the New York Experiment Station (Geneva) has a Herbert red raspberry × loganberry; George Fraser of Ucluelet, British Columbia, sends me specimens of his crosses between loganberry and native dewberry, loganberry and *R. laciniatus* (infertile), and *R. spectabilis* (infertile but flowers showy), and *R. parviflorus* or *nutkanus* (fertile), and English raspberry (infertile); a brief account of some of these crosses appears in the Agricultural Journal of the Department of Agriculture, Victoria, British Columbia, November 1921, 213. Mr. Fraser sends me specimens of crosses between Phenomenal and native dewberry, and a double-flowered loganberry.

Quite another problem is the Mammoth blackberry. This also was produced by Judge Logan, the origin of which he detailed to me in 1902:

"Since 1881 I have planted a good many seeds of this *Rubus ursinus* fertilized with the Texas Early. About twelve years ago there appeared among these seedlings,—and it is uncertain from what year's planting it came,—a most remarkable blackberry. The canes are enormous. I have a plant now growing in my grounds, which grew one cane or stalk last year for this year's fruiting, of one hundred and forty-nine feet of fruit wood. This single plant will cover with foliage a wall forty feet long and from six to eight feet wide, and the amount of fruit it will produce is not now capable of calculation. The fruit of this enormous berry is equally colossal; berries are frequently found two and one-half inches long. The fruit is similar to the wild Rubus, being less sharply acid, and when perfectly ripe is sweet and delicious. This berry I have named the 'Mammoth'. Its fruit is similar to the Loganberry only it is less acid, better for eating raw, but with most people it is not as popular as the Loganberry for sauce or jelly, and it is utterly insipid in short-cake. The Mammoth fruits perhaps a couple of weeks later than the Loganberry, and is jet black in color".

A good early portrait and account of the Mammoth appeared on the front page of Pacific Rural Press for September 4, 1897. The herbarium material of the Mammoth shows a plant with strong botanical characters, the foliage marked yet suggesting some forms of wild *R. vitifolius* but the spines indicating something very different. The Cory Thornless, another strong grower (said to have been discovered in the mountain pass of Tuolumne Co., Calif.) has similar foliage and fruit characters; sometimes the canes are unarmed but often the branches bear strong spines; and it is further remarkable that the thorny laterals have larger flowers than those on the unarmed twigs and with less pointed conspicuous petals. I have received specimens of "Mammoth Thornless" which I cannot distinguish from Cory. If the Mammoth is not a hybrid then I cannot place it. The Texas Early is itself a puzzle. With Dallas, Jordan, Crandall (which may be the same as Texas Early), and perhaps others, it constitutes a marked group. I

suspect that when the native Rubi of Texas are collected we shall find another species, unless they are to be included in my *R. velox*.

Apparently there is another plant called Mammoth, having the character of loganberry, or else plantings have become mixed; and the name Mammoth Himalayaberry is sometimes shortened to Mammoth. See, also, p. 306, Bull. 34, Cornell Exper. Sta.

CCC. *Canes usually not pruinose: main stems mostly completely prostrate: flowers bisexual: east-continent species.* (CC on page 153).

FLAGELLARES

D. *Leaflets, particularly on the turions or new growths, broad and mostly large,—of the ovate, cuneate-ovate or broad-ovate kind: plants without bristles; prickles mostly not prominently broad-based, at least not in the inflorescence (where they are often lacking): deciduous, northern and southern.* (DD page 170).

23. **Rubus flagellaris,** Willd. Enum. Plant. 549 (1809). Figs. 64, 65.
R. procumbens, Muhl., apud. Auth.
R. Canadensis var. *roribaccus,* Bailey, Amer. Gard. xii, 642 (1890). A robust large-fruited form.
R. villosus var. *roribaccus,* Bailey, Sketch Evol. Nat. Fruits, 373 (1898).
R. subuniflorus, Rydb. in Britt. Man. 498 (1901), apud Rydb. N. Amer. Fl. xxii, 474 (1913).
R. aboriginum, Rydb. N. Amer. Fl. xxii, 473 (1913).

The common dewberry of eastern North America, distinguished by its long trailing habit, rather weak prickles that are not much broadened or flattened at base, glabrous or only lightly pubescent character, and the nature of the inflorescence which (when the flowers are not solitary) is characterized by one flower following and overtopping the other on mostly slender erect pedicels, making a few-flowered progressively forking cluster.

It is a variable species of wide range, but its characters hold fairly well if it is not split into arbitrary herbarium forms. On poor dry lands its flowering shoots are short and the flowers may be solitary, but in the same colony one will probably find the forking flowering habit; by cutting a specimen in two one may often get the two things and think them distinct species. Under some conditions, as in dry woods, the weak flowering shoots are almost herbaceous. In the same colony one may find simple and 3-foliolate leaves in the flower-cluster. Some colonies run rather strongly to broad nearly obtuse leaves on the flowering shoots. In all such cases, the turions, or strong sterile canes, more clearly show the connections. Different patches or colonies, even though contiguous, are likely to have special facies; this is not strange seeing that a colony may be the progeny of a single plant that multiplies asexually. Frequently plants that bear solitary flowers early in the year from repent canes will throw up short several-flowered erect or ascending shoots later in the season. The villosity varies considerably without apparent relation to other characters, but mostly, except on growing tips, the plant is glabrous except for the hairiness on the nerves on the under surface of leaves; yet there are more or less pubescent races. The plant is essentially glandless, yet sometimes there are small dry glands, particularly on petioles, and these may be stalked or sessile. The length of pedicels varies with vigor. Sepals also are variable in size, as well as size of flowers and fruits. Fig. 65 shows characteristic differences in neighboring patches.

The range of this plant, according to Blanchard (Bull. Torr. Bot. Club, xxxviii, 432. 1911) "covers more square miles than any other blackberry in eastern North America. It ranges from the Gulf of Mexico to the southern limit of *R. canadensis* [which, aside from the southward extension in mountains, is 'near the northern boundary of Massachusetts, or near the 43d parallel']. To be more specific, its eastern limit is the Kennebec

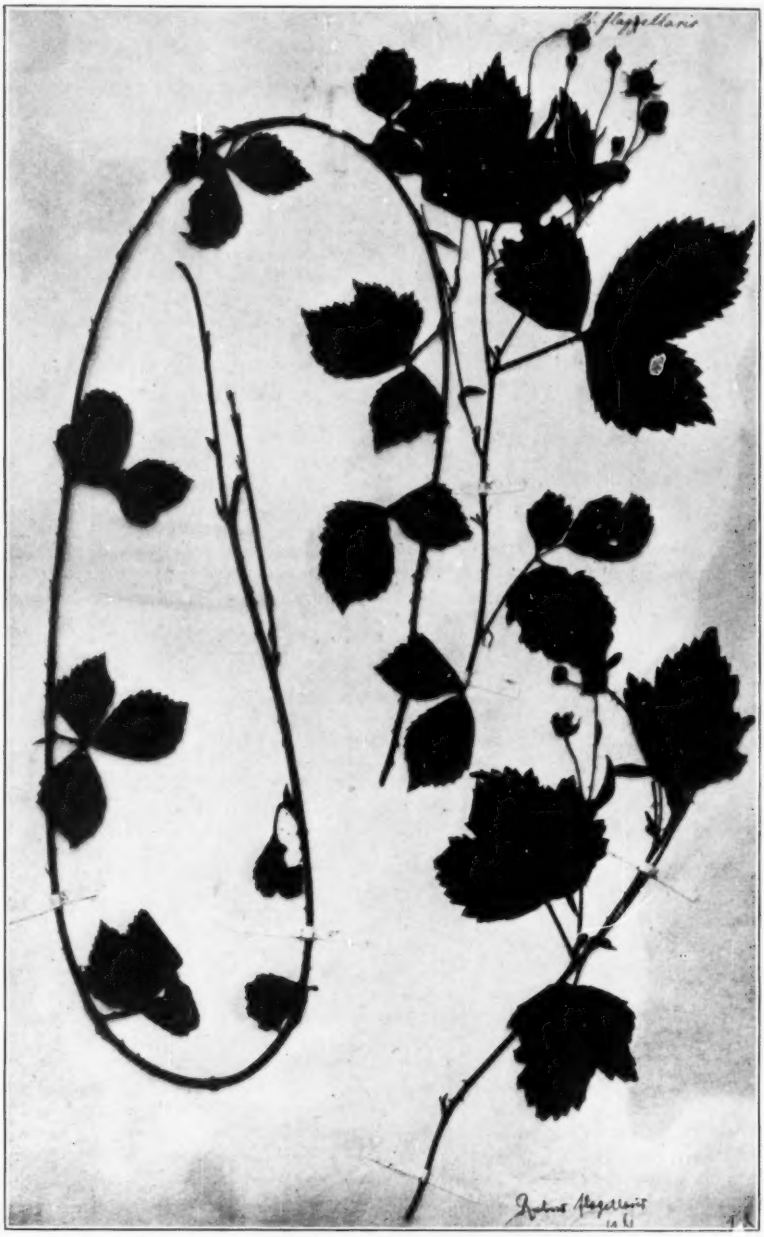

FIG. 64. TYPE SHEET OF *Rubus flagellaris*.

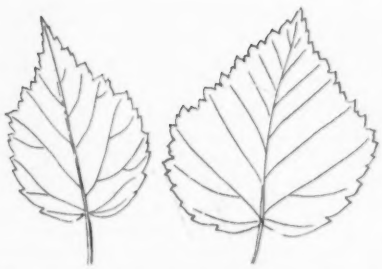

FIG. 65. FORMS OF TERMINAL LEAFLETS ON TURIONS OF *Rubus flagellaris* AS FOUND IN SEPARATE COLONIES.

River in Maine, and a line due west from Portland, Maine, or about the 44th parallel, is near the northern boundary of its range. It undoubtedly occurs in every state east of the Rocky Mountains, with possibly the exception of North Dakota. It is not everywhere equally abundant. In the northern parts of Ohio and Indiana it is scarce, though abundant on the shore of Lake Michigan. It is the same plant wherever found, the same in Boston as in Pensacola, New York as in Oklahoma, Michigan as in Georgia".

The type specimen of *R. flagellaris* is in the Willdenow Herbarium. I saw it in Berlin more than twenty-five years ago and was puzzled by it. I can now easily match Willdenow's specimen and satisfy his diagnosis from American material. A photograph of *R. flagellaris*, type, is seen in Fig. 64. His diagnosis is this:

"R. foliis ternatis glabris inaequaliter serratis, intermedio ovato basi cuneato, lateralibus rhombeis, caule tereti procumbente, petiolisque recurvato-aculeatis.

"Habitat in America boreali.

"Caulis fruticosus prostratus longissimus ramosus, ramis teretibus glabris aculeatis. Aculei sparsi breves rigidi crassi uncinati. Folia ternati utrinque glaberrima. Foliola pollicaria acuta inaequaliter serrata, terminale seu intermedium ovatum basi cuneatum petiolatum, lateralia sessilia rhombea. Petioli teretes aculeis sparsis uncinatis obsiti."

It is now the custom to use the name *R. procumbens*, Muhl. for the common dewberry. This name starts in Muhlenberg's Catalogus Plantarum Americæ Septentrionalis, 1813, and is repeated in the second edition in 1818, in both cases being a *nomen nudum*. Rydberg (N. Amer. Flora, xxii, 474) dates the species from Barton, Compendium Floræ Philadelphicæ, 1, 233 (1818), but the description there is not from Muhlenberg; in fact, Barton has "Mich. and Pursh" after his description and then cites *R. procumbens*, Muhl. and *R. trivialis*. Mich. as synonyms. There is no specimen in Muhlenberg's herbarium of the plant to which his name is made to apply, but there is a specimen, without name, of *R. hispidus;* and it is interesting to note Blanchard's remark (Rhodora, viii, 148) that "the writer has recently (July, 1906) searched for several days in the southeastern part of Pennsylvania including Lancaster, Muhlenberg's old home and with the exception of a little *R. hispidus* no other dewberry could be found". Muhlenberg lists *R. hispidus;* under *R. procumbens* he gives *R. trivialis* as a synonym.

It is clear that *R. procumbens*, Muhl. must be dropped.

Rubus flagellaris is full of perplexities, although when we come to understand it, we may find it no more variable or inclusive than the accepted *R. canadensis* and *R. alleghensis*. For the present, however, it is probably the most difficult of the North American Eubati. Many of the variables remain in doubt because we do not have foliage of the new canes or good notes on habit, or sufficient collections to give us significant ranges.

In cultivation, the Geer, Windom and Lucretia's Sister represent *R. flagellaris*, but I do not know that these varieties are now grown.

The plant I once named *roribaccus* represents a strong well developed race, the Lucretia dewberry, distinguished by large cuneate-obovate double-serrate leaflets, flower-stalks 3-6 inches long and strongly overtopping the foliage of flowering shoots, flowers large and sometimes as much as 2 inches across, sepals often developed into long

and frequently lobed appendages: fruit large, thimble-shaped, of good quality. In the larger conception of the species, this variety becomes decidedly subordinate; but if for horticultural convenience it should have a botanical name, it naturally becomes †**R. flagellaris** var. **roribaccus.**

A picture of the plant on which the variety *roribaccus* was founded, as published in American Garden in 1890, is reproduced, in part and in smaller size, in Fig. 66. I now refer to this variety forms found rather freely in the wild, even though they may not bear flowers and fruits of the great size of the cultivated Lucretia. More than twenty-five years ago I made a considerable plantation of Lucretia. For twenty years now the place has run wild, without any cultivation or other attention; the plants have taken possession of part of the area and still bear freely; and they retain their original characters, only with some dimunution in size of fruit.

FIG. 66. LUCRETIA DEWBERRY, A FORM OF *Rubus flagellaris.*

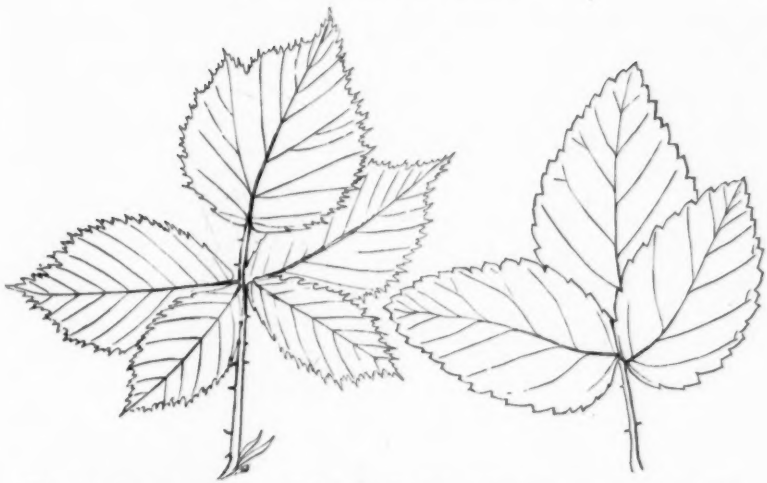

FIG. 67. LEAF MARGINS OF *Rubus flagellaris* VAR. *invisus*, RIGHT, AND OF VAR. *michiganensis*, LEFT. (x½). EITHER VARIETY MAY HAVE 3 OR 5 LEAFLETS.

†**R. flagellaris** var. **invisus,** n. st.* Fig. 67, right.
R. Canadensis var. *invisus*, Bailey, Amer. Gard. xii, 83 (1891).
R. invisus, Britt. Mem. Torr. Bot. Club, iv, 115 (1893); Bailey, Sketch Evol. Nat. Fruits, 374 (1898).

Marked particularly by the large and nearly simple broad apiculate dentation of the leaflets and the foliage mostly light-colored: stems somewhat ascending but soon decumbent, not very prickly.

To this race belong the horticultural kinds Bartel, Never Fail, General Grant. This plant is well marked in the wild in many cases, particularly westward. I have excellent material from B. F. Bush, western Missouri, and it is apparently widespread in Michigan and Indiana. Flowering shoots have a very distinct look. The light green color is marked.

†**R. flagellaris** var. **michiganensis,** n. st. Fig. 67, left.
R. villosus var. *Michiganensis*, Card; Bailey Sketch Evol. Nat Fruits, 374 (1898)

Robust plant, marked particularly by the deeply and irregularly toothed or cut-toothed leaflets. This plant was originally collected by me on sand banks of Lake Michigan in southwestern Michigan, in 1891, and I have it from Indiana. Rydberg puts Var. *michiganensis* and *R. geophilus*, Blanch. Rhod. viii, 148 (1906) together, but although they are similar I think them distinct yet both (at least the latter) forms of *R. flagellaris*. Blanchard's species was described from collections in southwestern Maine, but I have subsequent collections of his, and so named, from Massachusetts. Rydberg extends the range to Connecticut and New Jersey.

The Austin or Mayes dewberry is of the Michiganensis-Geophilus type. This variety is reported as having been found in the wild in Texas. Blanchard remarks, when describing *R. geophilus*, that "this large dewberry may be worthy of cultivation".

Rydberg (N. Amer. Flora, xxii, 473) places the var. *michiganensis* an *R. geophilus* under *R. heterophyllus*, Willd. The last name starts in Willdenow Enum. Hort. Berol.

*Status novus; see Gent. Herb. 8.

Suppl. without description or locality. In the Berliner Baumzucht, second edition, ii, 413 (1811), however, a diagnosis is given, but he remarks: "Das Vaterland ist unbekannt, vermuthlick Nordamerica". I saw the type specimen in his herbarium in Berlin many years ago; it is only a tip piece of a turion, Fig. 68. It is clear that this is only a fragment of the plant known to Willdenow. I hesitate to place the fragment, and particularly as the name is not needed in this connection since it must date from 1811 and *R. flagellaris* has two years the start. At the time I went over the Berlin material I was able to identify *R. inermis*, Link, grown in gardens and ascribed to America, with *R. ulmifolius* of southeastern Europe; perhaps *R. heterophyllus* may likewise represent some other flora than North American. Willdenow speaks of it as "Eine zwei fuss hohe Art mit vielen liegenden stengeln". Blanchard speaks of his *R. geophilus* as "perfectly prostrate". Neither Focke or Sudre account for *R. heterophyllus*. It may be the plant now known as *R. recurvans* (see p. 190). I am inclined to let it drop as a *nomen dubium*.

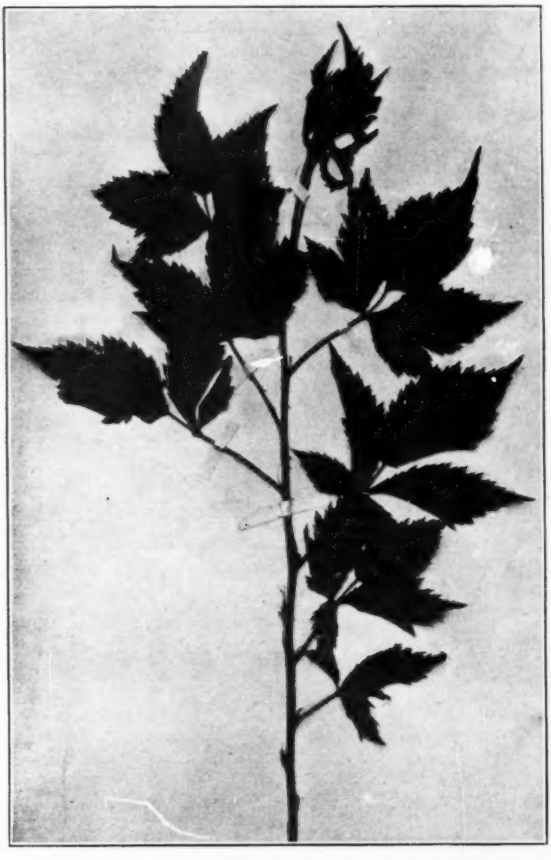

FIG. 68. TYPE SPECIMEN OF *Rubus heterophyllus*.

Rubus Enslenii, Tratt. Ros. Monogr. iii, 63 (1823) is not yet understood. The original collection was probably made in the lower South. The specimens are in the Naturhist. Hofmuseums in Vienna. They are small and fragmentary, as shown in the reproduction in Fig. 69. I have a careful reconstruction and analysis of these specimens made for me at the time of my early studies through the courtesy of Professor Beck of Vienna; part of this reconstruction was shown in my "Sketch of the Evolution of Our Native Fruits" and is printed again in Fig. 70. I find a good match for Enslen's specimens in Tracy 4105, from Biloxi, Mississippi, and I have other material probably referable to it; these

specimens look to be very distinct; but to this day I do not know the turions of undoubted *R. Enslenii* nor do the original specimens show them. Practically no additional material has accumulated in the collections I have seen over that available twenty-five years ago.

I find my notes made in the herbarium at Berlin in 1897, in the presence of Willdenow's material, as follows: "I think *R. Enslenii* is only a weaker and softer form of *R. flagellaris;* leaves of *flagellaris* larger and tending to be less compound, and spines pronounced; pubescence same in both". And again: "*R. flagellaris* is *Enslenii* except stronger, with prominent hooked spines, larger and broader leaflets, and 2-3-flowered clusters; toothing of leaves and weak habit the same. *R. Enslenii* is evidently only a

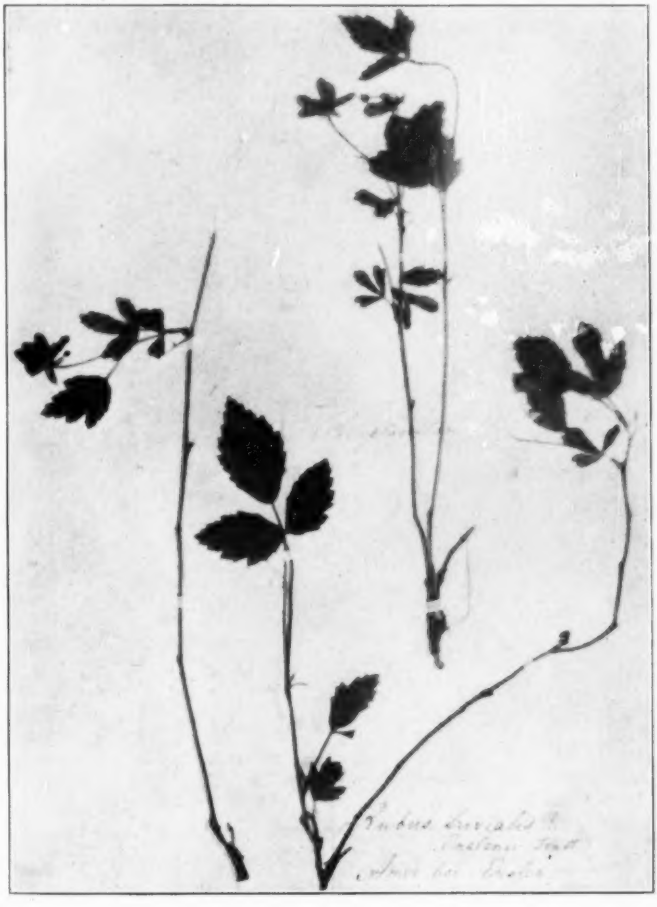

FIG. 69. TYPE SHEET OF *Rubus Enslenii.*

weak form of *flagellaris*, and both are a weak form of *R. canadensis* [the name at that time applied to the common dewberry]". The specimens at Vienna had been first named *R. trivialis*, and across the sheet some one has written "R. flagellaris W." Trattinick in his diagnosis discusses the probable relation of the species to *R. trivialis*, *R. hispidus* and *R. flagellaris*. The evident herbaceous nature of the Enslen specimens (although Trattinick does not mention it) has misled us. These forms now and then turn up, and there are other forms that perplex me; but before I accept any of them as species I must see sufficient continuity in them to give a geographical range.

FIG. 70. PART OF A RECONSTRUCTION OF *Rubus Enslenii*.

In my Sketch I regarded *R. Enslenii* as a good species, making *R. Baileyanus* a synonym of it, being led to this position, as I keyed it, by "penduncles mostly 1– or 2– flowered". Further study of the dewberries leads me to reject this kind of separation, as it does not hold; and I am interested to find that in a large range of material collected and named *R. procumbens* by Blanchard, who was keen to give value to small differences, one-flowered and other forms are included. Blanchard never accepted *R. Enslenii* and *R. Baileyanus*. Speaking of these plants he said in 1911: "My observations lead me to think that Mr. E. P. Bicknell's *R. Baileyanus* is a shade form of *R. procumbens*, that his *R. Enslenii* is a common sand form of the same species, and, if these two assumed species were transplanted so as to grow under such conditions as typical *R. procumbens* usually has, they would in time return to a form unmistakably that of *R. procumbens*".

Rubus Baileyanus, Britt. Mem. Torr. Club, v, 185 (1893–4) is founded on synonymy: *R. villosus* var. *humifusus*, Torr. & Gray, Fl. N. Amer. 1,455 (1840), and *R. invisus*, Britt. Bull. Torr. Bot. Club., xx, 278 (1893). The *humifusus* is variety γ of Torrey and Gray, the β being var. *frondosus*. The γ *humifusus* has "stems procumbent or trailing; leaves smaller; peduncles 1-5-flowered. *R. Enslenii*, Tratt, Rosac. 3, p. 63? *R. floridus*, Tratt. l.c.?". The type specimen is taken to be one in Hb. Torrey. collected at West Point. It has no date. It is a thin-leaved plant with one-flowered peduncles; it is shown

in Fig. 71. Another sheet from Bloomingdale, New York City, 1829, marked γ by Torrey but with a question mark against it (whether the mark is contemporaneous I do not know) has regular flagellaris-like leaves and inflorescence.

The *Rubus invisus* of Britton in the Torrey Bulletin, 1893, which he subsequently raised to *R. Baileyanus*, is founded on the var. *humifusus* of Torrey and Gray together with collections and field observations, particular reference being made to plants "exceedingly abundant on wooded hills in southwestern Virginia". It is described as "a procumbent or ascending species, pubescent or nearly glabrous, the stem slender, sparingly prickly, the upper leaves almost invariably unifoliolate, and the racemes but 1-few-flowered. The leaflets are broadly ovate to oval, acute or more commonly obtuse, thin, the terminal ones usually cordate, or all of them rounded or obtuse at the base; the fruit is small in all the specimens seen by me. The plant appears to be always a dry woods species". I have a specimen of the southwestern Virginian collection, and I have similar plants from other places. I have several times examined the Torrey and Gray specimens. The plant is characterized by thin leaves. Whether *R. Baileyanus* is a woods or occasional state of *R. flagellaris* I do not know; I can get no coherent geograph-

FIG. 71. THE SPECIMEN USUALLY TAKEN AS THE TYPE OF *Rubus Baileyanus*.—*R. villosus* VAR. *humifusus*, TORR. & GRAY.

ical range nor consistent characters from all the random specimens I have seen. Practically all the material named *R. Baileyanus* in collections is straight *R. flagellaris*. In my Sketch (1898) I referred *R. Baileyanus* to *R. Enslenii;* I should hardly do that now, but I cannot place it till complete specimens in ample quantity accumulate.

Rubus ostryifolius, Rydb, in Britt. Man. 497 (1901), "type from Atlantic Highlands, N. J." is apparently a shade form; the label says "in woods near lighthouses". Bicknell makes it *R. argutus* × *Enslenii*, a disposition accepted by Rydberg, N. Amer. Fl. xxii, 465. It apparently belongs to the thin-leaved series associated with *R. Baileyanus*.

The Flagellares, or Flagellaris Associates, so far as I know them (aside from the dubious *R. Enslenii* and *R. Baileyanus*) are six:

a. Petioles, pedicels and other parts essentially glandless (sometimes glandular on calyx).
  b. Flowers solitary, or if few then in a forking cluster formed by successive erect pedicels surpassing the previous ones. *R. flagellaris*
  bb. Flowers several in definite short cymose clusters, with more or less spreading pedicels.

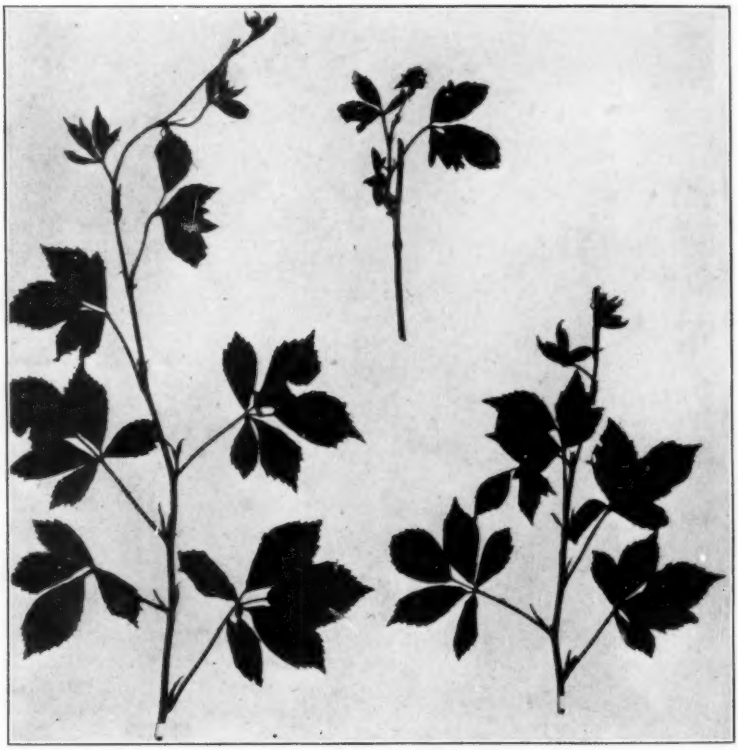

FIG. 72. THE TYPE SHEET OF *Rubus villosus*.

c. Canes nearly or quite terete, moderately or weakly prickly.
d. Leaves with impressed or promiment veins as if plaited: clusters not prominently leafy, the flowers and fruits showing well above the foliage. *R. plicatifolius*
dd. Leaves not plaited: clusters with prominent broad leaves, most of which are simple.
e. Plant prominently pubescent. *R. arenicola.*
ee. Plant essentially glabrous. *R. recurvicaulis.*
cc. Canes strongly angled and stoutly prickly. *R. velox*
aa. Petioles, pedicels and often the canes with prominent stalked glands. *R. Boyntoni*

24. **Rubus plicatifolius**, Blanch. Rhodora, viii, 149 (1906).
R. villosus, Ait. Hort. Kew. ii, 210 (1789), not Thunb, probably.

Apparently a well-marked species, among other marks bearing 5-foliolate leaves nearly to the extremity of the turions; and apparently, also, it has a wide range in the northeastern country. The plant has large leaves.

I have not seen cultivated dewberries belonging to it.

The first North American Rubus described after Linnæus is *R. villosus*, Ait.: "R. foliis quinatis ellipticis acuminatis argute serratis utrinque villosis, caulibus petiolisque aculeatis. Hairy Bramble. Nat. of North America."

This species was supposed by American botanists to be the high-bush blackberry (*R. allegheniensis*) until I inspected the type specimens in the British Museum in 1896. In my Sketch (1898, p. 367) I wrote that Aiton's "specimens are mostly sterile shoots, and are from plants which were grown in the Kew gardens. Ordinarily the dewberry is not villous, and the name, therefore, is a misnomer; but Aiton made the name because the the tips of the verdurous shoots of the dewberry contain a villous pubescence. These leafy tips are rarely seen in herbaria, and it is, therefore, not strange that the specimens of Aiton have been misunderstood". I used the name *villosus*, therefore, for the common dewberry (*R. flagellaris*), which up to that time had been erroneously known as *R. canadensis* and which has later been called *R. procumbens*. At that time *R. plicatifolius* had not been separated, and I do not recall ever to have seen the plant. Aiton's sheet is shown in Fig. 72.

The *Rubus villosus* of Aiton is antedated by Thunberg's *R. villosus*, 1784. Thunberg's name is regarded as a homonyn of *R. corchorifolius*, L.f., from China, and under the International Rules of Nomenclature (Art. 50) it does not invaliadate the later *R. villosus* of Aiton, although under the American Code Aiton's name must be reduced. I am inclined to adopt the latter disposition, and subordinate *R. villosus* of Aiton, because one never knows what may subsequently be regarded as a synonym in Rubus, and this is specially pertinent in the present case inasmuch as *R. corchorifolius* is very variable, and the present tendency is to separate Chinese and Japanese plants. Focke distinguishes forms that may be considered as subspecies; and, moreover, I remember the admonition in the International Rules that one is to "avoid names which have been used before in the genus, or in any closely allied genus, and which have lapsed into synonymy", even though the recommendation applies only to names newly made, thereby emphasizing the importance of keeping a genus free of duplicate names.

25. **Rubus arenicola,** Blanch. Rhodora, viii, 151 (1906).*
Leaves mostly small, only seldom 5-foliolate. Often the flowers are well covered in the foliage, and the plant is prominently pubescent. Plant "perfectly prostrate". Its reported range is Massachusetts to Nova Scotia. I have seen no cultivated forms.

*This name was written *arenicolus* by Blanchard, as if it were an adjective agreeing with its genus in termination, but it is a noun in apposition; *amnicolus* is a similar case.

26. **Rubus recurvicaulis**, Blanch. Rhodora, viii, 153 (1906).

This is very close to *R. arenicola* and perhaps not clearly separable. It is a recurved rather than wholly prostrate plant, glabrous or nearly so, with fewer spines, larger leaves, more deeply dentate leaflets on flowering shoots. Maine and Nova Scotia.

† 27. **Rubus velox,** spec. vel. cultg. nov. Figs. 73, 74.

Species Flagellarium: robusta, eglandulosa; turiones recumbentes et repentes, plurium pedum longitudinem attingentes, juventute pubescentes, manifeste angulati, aciculis validis basi dilatatis acutissimis curvatis vel uncinatis muniti, setis destituti; petioli longi pubescentes et costae aciculis uncinatis conspicuis armati: turionum folia 3-foliolata vel 5-foliolata et pedata; foliolum terminale longe petiolatum, ovatum vel elliptico-ovatum, 7–10 cm. longi, lateralia angustiora, breviter petiolulata, margine argute et pleraque dupliciter dentata, supra sparse et subtus molliter pubescentia, autumnalia minus pubescentia: folia ramorum floriferorum simplicia vel ternata; lamina vel foliola oblonga vel oblongo-ovata, 7–10 cm. longa, basi attenuata, breviter acuta, dentibus pro rata paucis magnis conspicuis et venis robustis instructa, ad costam aciculis paucis munita; stipulae longae, conspicuae, interdum dentatae: flores bisexuales, sed saepe steriles, solitarii vel in inflorescentia pluries furcata, pedunculo elongato pubescente; calycis lobi magni, saepe foliacei et lobati: fructus oblongus, 2½ cm. vel ultra longus, niger, praecocissimus.

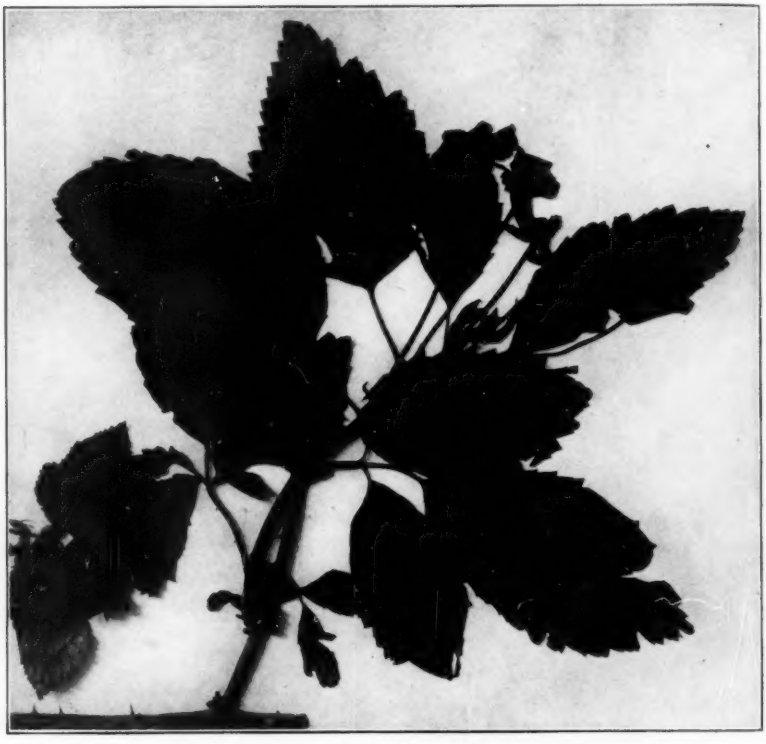

Fig. 73. Flowering shoot of *Rubus velox*.

For some time I have known this plant in cultivation, particularly in the varieties McDonald (another McDonald is *R. trivialis*), and Sorsby May; perhaps Premo belongs here. These are commonly considered to be blackberry-dewberry hybrids, all originating apparently in Texas or the Southwestern region. I do not certainly know it native, although incomplete wild specimens I have seen from an unidentified station in Texas may be of this species. I expect that the plant will be found when the Rubi of the Southwest are collected. It is possible that this is the Texan species of which I have other indication among the cultivated Rubi. (Cf. pages 156-7).

Ness speaks of the McDonald as a blackberry, "native of Texas, introduced into cultivation by the Texas Nursery Company" (Breeding work with blackberries and raspberries, Jour. Heredity, Dec. 1921. Detjen lists it among hybrids (Tech. Bull. 11, N. Car. 6). It is evident that we have here a considerable problem in native as well as in cultivated Rubus.

Rubus velox is a robust glandless plant, the canes arching and running and becoming several feet long, puberulent when young, strongly angled, bearing stout very sharp broad-based curved or hooked prickles, free of bristles, the long puberulent petioles and the ribs also with prominent hooked prickles: leaflets on turions 3, or 5 and pedate, the terminal one long-stalked, ovate or elliptic-ovate and 3–4 in. long, the lateral ones narrower and short-stalked, margins sharply and mostly doubly dentate, sparsely hairy above and soft-pubescent beneath, those of autumn growth less pubescent; leaves on flowering shoots simple or ternate, the leaflets or blade oblong to oblong-ovate, ¾ inches long, narrowing to base, short-acute, with relatively few very large and prominent teeth and strong side-ribs, with few prickles on midrib; stipules long and prominent, sometimes dentate: flowers bisexual but often infertile, solitary or in a successively forking inflorescence, on elongated pubescent peduncles; petals sometimes more than 5, flowers 1–1¼ inch across; calyx-lobes large, often foliaceous and lobed: fruit oblong, 1 inch or more long, black, very early.

FIG. 74. TURION LEAF OF *Rubus velox*. (× nearly ½).

28. **Rubus Boyntoni,** Ashe, Journ. Elisha Mitchell Sci. Soc. xix, 9 (1903).

A vigorous and distinct species with nearly or quite terete canes 20–30 feet long, bearing short spines of two sizes, rooting tips, showy flowers nearly 2 inches across in often elongated clusters: fruit ¾ inch long, black, sweet. North Carolina; perhaps to be associated with the Frondosi.

Rubus immanis, Ashe, l.c. 8, I know only from the description. Ashe says that it is "evidently related to *R. Boyntoni*, but far larger and lacking its long prostrate tips." The stems are stout and "at first erect or ascending, then spreading or reclining, at least the tips". It inhabits Wautauga County, North Carolina.

Rubus multiformis, Blanch. Rhod. viii, 179 (1906) I do not understand. Its habit would seem to place it with the Flagellares: "very long wide-branched canes, decumbent or erect at first, then creeping a long distance on the ground and tipping". There are glandular and glandless forms. Rydberg (N. Amer. Fl. xxii, 473) makes it *R. nigricans* × *R. plicatifolius*. Brainerd and Peitersen (Vt. Bull. 217, 81) consider the species a mixture, as they make it in part *R. Baileyanus* × *canadensis* and in part *R. canadensis* × *flagellaris*. Fernald says (Rhodora, xxiii, 269) that "Blanchard included different plants under this name". (See page 183).

TRIVIALES

DD. *Leaflets, particularly on new growths, narrow,—of the lanceolate, oblong or oval kind: plants usually with bristles as well as prickles, the latter conspicuously broad-based and prominent both on turions and in inflorescence: southern.* (D page 157.)

We come now to the southern dewberries. They are essentially evergreen very prostrate plants. In this group is one historic species, *R. trivialis*, but three Trivialis Associates are in the recent literature. It is yet too early to assess the merits of the species; much more thorough collecting is needed; and yet I cannot make even a useful list without venturing to separate one plant as new.

A good number of pomological varieties have been named in the Trivialis, all apparently chosen from promising wild plants or from chance seedlings. None of them apparently has attained any extensive popularity or has long retained it. They appear to be all regular *R. trivialis*, although on this point I do not wish to be positive. Those I have seen are: Bauer, Drishill, Eight Ells, Extra, Houston, Howard, Lime Kiln, Long Branch, Lost Ball, McDonald (another McDonald is *R. velox*), Manatee, Muchee Grandee, Race Track, Rockledge, Rogers, White (Haygood's from Louisiana, Wilson's from Texas). The Trivialis are probably destined to contribute an important part to pomology, and some of the native races are ornamental in bloom. The group is much in need of thorough study.

The five Trivialis are these:

a. Leaflets of turions simply-serrate, usually prominently acuminate.
  b. Canes, or at least the new ones, bristly.
    c. Flowering shoots bearing small obtuse or only short-acute leaflets. *R. trivialis*
    cc. Flowering shoots bearing long and narrow very acuminate leaflets. *R. mississippianus*
  bb. Canes destitute of bristles. *R. lucidus*
aa. Leaflets of turions doubly-serrate, obtuse or only short-acuminate.
  b. Canes densely glandular-hispid with colored bristles. *R. rubrisetus*
  bb. Canes more or less bristly but not red-glandular *R. continentalis*

29. **Rubus trivialis**, Michx. Fl. Bor. Amer. 1, 296 (1803).

Michaux records the plant as growing in "Carolina et Pennsylvania, ubique frequens", although I know of no authentic modern range north of Virginia. The type specimen is in Paris, where I examined it many years ago; it is shown in Fig. 75. There are only flowering canes; yet the specimens are those of *R. trivialis* as we have understood it. The canes are bristly as well as prickly, although this feature may be lost in the reproduction; the leaves are simply rather than doubly serrate, and the flowers are solitary.

† 30. **Rubus mississippianus**, spec. nov. Fig. 76.

Species distans Trivialium, glabritie, foliolis angustissimis, floribus solitariis longe pedicellatis insignis: turiones tenues et longe repentes, setis paucis exceptis glabri, aciculis gracilibus curvatis basi applanatis muniti: folia in turionibus fructiferis 3- vel 5-foliolata, glabra vel subtus ad costas leviter pubescentes, petiolo gracili aculeato; foliola oblongo-lanceolata, terminalia 3-5 cm. longa et 1-1½ cm. lata, argute acuminata, argute et pleraque simpliciter serrata, supra lucida: flores solitarii, pedicellis erectis gracilibus aculeatis 7-10 cm. longis et folia superantibus sustenti; corolla 2½-3 cm. diametiens, petalis obovatis obtusis.

This segregate from the Trivialis group is founded on Tracy No. 4114 collected in 1898 on Tchouticabouef Creek, Biloxi, Mississippi. It is distinguished as a slender glabrous trailer bearing many weak but sharp hooked flat-based prickles on stems, petioles and peduncles, and a few scattered bristles on the stem; very narrow oblong-lanceolate sharp-acuminate leaflets about 2 inches long, with simple sharp serratures, shining above: flowers solitary and large, 1 inch or more across, on slender peduncles that rise above the foliage. The specimens are without turions; but I have turions from

FIG. 75. TYPE SHEET OF *Rubus trivialis.*

FIG. 76. SPECIMENS ON WHICH *Rubus mississippianus* IS FOUNDED.

other collections representing apparently the same plant but which I have not described; it is to be expected that the bristles will be more pronounced on the turions. Only fuller collections can settle the merits of this species; but it is hoped the separation here will call the attention of collectors to it.

31. **Rubus lucidus**, Rydb. N. Amer. Fl. xxii, 479 (1913).

Plant without bristles, although prickly: leaves dark green and shining, glabrous on both surfaces except midveins beneath, simply serrate, the leaflets lanceolate and acute: inflorescence usually several-flowered.

32. **Rubus rubrisetus**, Rydb. in Britt. Man. Fl. Northeast. States and Can. 497 (1901).

Plant densely glandular-hispid with red or purplish bristles, weakly prickly: leaves thick, glabrous except on veins beneath, dark green and shining above, irregularly or doubly serrate, the leaflets obovate or lance-ovate: flowers 3–7 in small terminal corymbs.

†33. **Rubus continentalis,** n. st.

R. carpinifolius, Rydb. in Small Fl. Southeast. U. S. 519 (1903), not Wh. & N. nor Godr.

R. hispidus subsp. (?) *continentalis*, Focke, Bibl. Bot. heft 83^1, 86 (1914).

Plant more or less densely bristly and bearing also small recurved prickles: leaves thin, glabrous both surfaces, doubly serrate with broad rather blunt teeth, the leaflets elliptic or elliptic-obovate and obtuse or acute: flowers 1–4.

Hispidi

BB. *Plant with many stiff retrorse bristles but few if any real prickles.* (B page 153).

34. **Rubus hispidus,** L. Sp. Pl. 493 (1753).

R. sempervirens, Bigel. Fl. Bost. ed. 2, 201 (1824).

This species is founded on Kahm's collection in Canada: "3. Rubus foliis ternatis nudis, caulibus petiolisque hispidis. Caules viticulis longis, procumbentibus, lignosis, una cum petiolis adspersi setis rigidis. Folia ternata, nuda, inciso-serrata: intermedio pedicellato; pedunculi etjam hispidi."

A specimen is well preserved in the Linnean Herbarium, ticketed by Linnæus "K. 3 hispidus". It is photographed in Fig. 77. It is clearly the plant we have understood to be this species.

R. sempervirens is represented by a Bigelovian specimen in Hb. Torr. (N. Y. Bot. Gard.) Although fragmentary and without turions, it is undoubtedly *R. hispidus*.

Although *R. hispidus* may be offered by dealers in native plants, I know of no horticultural varieties of it.

Either there is more than one plant passing as *R. hispidus* or it is one of the most variable species in the flora. Usually it is understood to be a very slender small-leaved and small-flowered creeper. We do not often find in the herbaria specimens of strong turions from the same plant as the running flowering shoots, and until these are regularly collected we cannot understand the species. Fig. 78 is a form with pointed leaflets. Blanchard wrote in 1906 (Rhodora, viii, 212): "The popular impression seems to be that this is a very weak plant and the herbaria collections mostly are such, but it is often of a very robust nature especially in elevated situations and on bleak shores. These forms seem to make it desirable to have them designated as a variety". He therefore proposes var. *major* for the "plants much larger in every way". It is not alone in size that the plant varies greatly, but in the habit, bristles, shape of leaflets, inflorescence, flowers. It is strange that this plant has not been the subject of as much segregation as the Setosi; but until it is carefully studied in many places and complete material accumulated,

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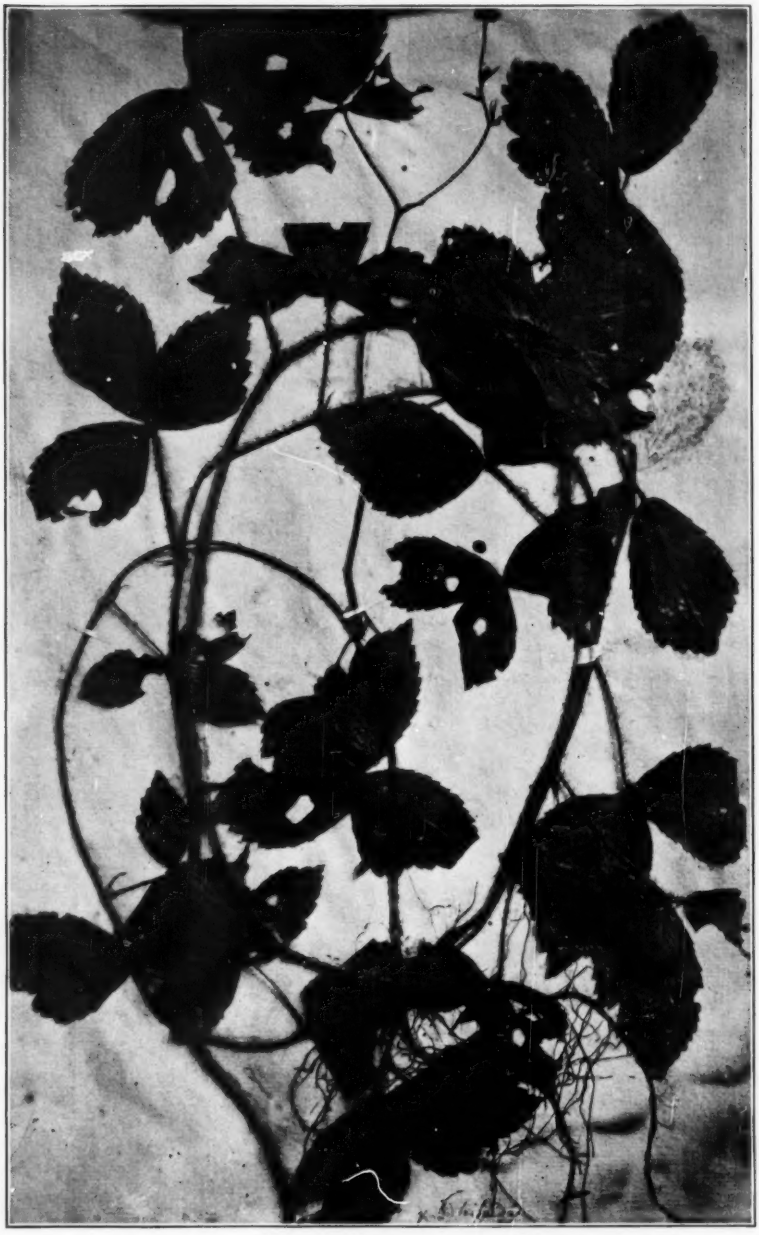

Fig. 77. Linnæus' sheet of *Rubus hispidus*.

FIG. 78. A HISPIDUS FORM WITH POINTED LEAFLETS.

it will be well to let the subject rest. However, I must separate one very marked form which comes to me in the Blanchard collection from southern Vermont, labelled by him "cut-lvd. dewberry.—Hispidus-like". I name it as follows:

†**Rubus hispidus** var. (?) **Blanchardianus,** var. nov. Fig. 79.

Turiones longi et prostrati vel repentes, setis reflexis dense vestiti pilis glanduliferis brevioribus immixtis, folia 3- vel 5-foliolata gerentes: foliola omnium partium ovata vel anguste ovata, apicem versus angustata et fere acuminata, venia impressis, margine profunde inciso-dentata: flores fructusque parvi, pedicellis glanduloso-setosis.

It is a question whether this belongs with *R. hispidus.* It may be a form of *R. jacens.* The canes are long and prostrate or running, densely covered with retrorse bristles interspersed with shorter glandular hairs, bearing 3- or 5-foliolate leaves: leaflets on all parts ovate to narrow-ovate, tapering to apex and perhaps acuminate, with impressed veins, the margins deeply cut-toothed: flowers and fruits small, on glandular-bristly pedicels. I hope to make a fuller report on this interesting plant at a later time.

The Hispidus Associates thus far recognized are three, although *R. jacens* might well go in the Setosi:

a. Plant nearly or quite devoid of bristles as well as of glandular hairs: new canes slender and prostrate, bearing 5-foliolate glabrous leaves, the leaflets narrowly oval to full oval and mostly narrowed or cuneate at base.

35. **Rubus cubitans,** Blanch. Torreya, vi, 148 (1906). Vermont.

aa. Plant otherwise, variously bristly and mostly glandular; new canes usually erect or ascending or at most decumbent.

b. Leaves of turions 3-foliolate: no prickles among the bristles.

36. **Rubus trifrons**, Blanch. Amer. Bot. xi, 11 (1906). Vermont.

bb. Leaves of turions commonly 5-foliolate: prickles often present: pedicels with few and scattered gland-tipped hairs or none.

37. **Rubus jacens**, Blanch. Torreya, vi, 147 (July, 1906).
R. semierectus, Blanch. Rhodora, viii, 156 (Aug. 1906). Vermont to Nova Scotia.

AA. *The blackberries,—plants erect or ascending, of "high-bush" habit for the most part, propagating commonly by means of suckers rather than by rooting at the nodes or tips, usually the native species deciduous.* (A page 153).

The term blackberry is broadly employed. On the Pacific Coast it is applied commonly to the *Rubus vitifolius* group, but there they have no wild bush blackberries of the eastern type and the name has been transferred to plants that are essentially run-

ning or need support in cultivation and which root at the tips and are perhaps more properly classed with dewberries. While some of the uncultivated species fall doubtfully into either group, blackberries or dewberries, yet the horticultural position of such as have been more or less domesticated is clear enough.

In North America, the high-bush blackberries are confined approximately to the eastern half of the continent. In the group now before us, some fifty species are proposed.

SETOSI

B. *The bristly blackberries.*—Canes erect at first or strongly ascending, usually not exceeding 3 feet high, mostly decumbent or even prostrate the second year, prevailingly bristly as are petioles and pedicels: leaves usually with a plicate appearance or impressed veins (at least when dry) or prominent beneath: inflorescence usually short and flowers small: no pomological varieties. (BB page 179).

38. **Rubus setosus**, Bigel. Fl. Bost. ed. *2*, 198 (1824).
R. hispidus var. *setosus*, Torr. & Gray, Fl. N. Amer. 1, 456 (1840).
R. hispidus var. *suberectus*, Peck, Rept. N. Y. State Museum, xliv, 31 (1891)
R. nigricans, Rydb. in Britt. Man. 498 (1901).
R. semisetosus, Blanch. Rhodora, ix, 8 (1907).

In this group we have an illustration of the progressive botanical exploration of the country as well as of the gradual refinement of the species-conception. *R. setosus* was founded by Jacob Bigelow in 1824. It was not recognized by Torrey in his Compendium, 1826. Although it was early accepted by Amos Eaton and by Beck, it was made a

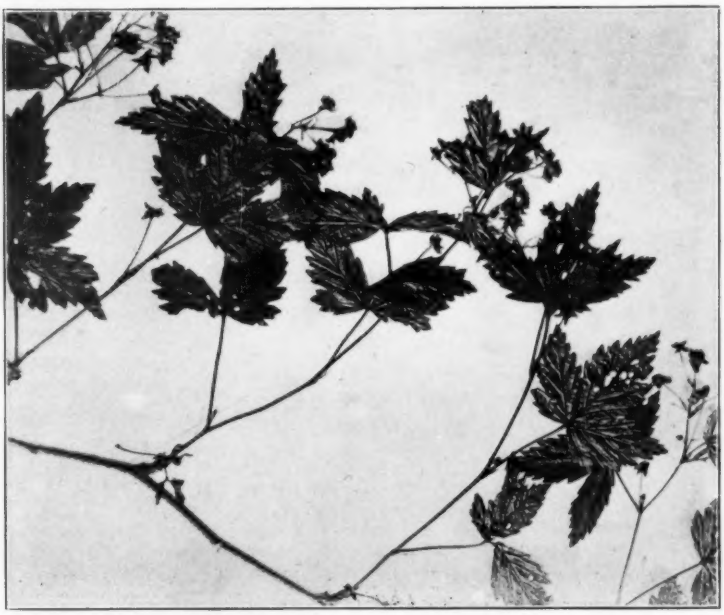

FIG. 79. SPECIMEN OF *Rubus hispidus* VAR.(?) *Blanchardianus*.

synonym of *R. hispidus* by Gray in the original Manual, 1848, where it remained until the sixth edition, by Watson and Coulter, 1890, when the synonymy was removed and the plant was omitted altogether. In the current (seventh) edition by Robinson and Fernald, 1908, it is given full standing. Species to nearly a score have now been erected in what would formerly have been taken as one variable thing. Some at least of these species have the external appearance of hybrids, but the ranges of a number of them extend far beyond the parents from which they might have arisen, and in abundant occurrences, lending a striking significance to them. Certainly we cannot regard all of them as chance hybrids. These species yield no cultivated forms, so far as I know, yet I have been much interested in them. On most of them I am not prepared to pronounce an opinion. Although some of them appear to be clearly distinct, yet as a class the characters are not such as give one a clear picture of outstanding species and the lines merge or vanish. Abundant field observations are needed, and the student should approach the subject with the intention of collecting all the forms rather than only the plants that appear to be "characteristic". I should scarcely attempt the identification of these segregates from the usual herbarium material, and I question whether some of them are clearly definable.

In erecting the species *R. setosus*, Bigelow made the following diagnosis:

"Stem erect, reclining, bristly; leaves ternate or quinate, smooth and green on both sides.

"Stem woody, erect at base, reclining, without prickles, but thickly covered with strong bristles. Petioles semicylindrical, channelled. Leaves ternate, a few younger ones quinate; leaflets rhomboid-lanceolate, acute at base, smooth, or with the veins pubescent underneath, unequally serrate, the odd one petioled. Stipules long and linear. Flowers in racemes with bristly pedicels. Petals white, linear-obovate, distant. Fruit red, ripening late. In a swamp at Sudbury."

Two sheets of *R. setosus* from Bigelow, collected in Sudbury, are in Herb. Torrey. (N. Y. Botanical Garden), the larger specimen being reproduced in Fig. 80. These are soft tip shoots and do not show the characters of the species. The fine bristles are evident on the woody part of the larger specimen, and in the inflorescence of both of them. There are no prickles, as Bigelow says, and he does not mention glandular hairs.

R. setosus has the new canes erect or ascending, 1–3 feet, the old canes becoming decumbent or prostrate with slender trailing tips: leaflets mostly narrowly oblanceolate and sharply serrate: inflorescence short-racemose and sometimes branched, the pedicels with few or abundant glandular hairs and mostly with slender bristles: fruit variable, of few drupelets, red to nearly black, mostly sour but sometimes agreeable to the taste. The species, as usually understood, extends from Maine (and probably eastward) to Pennsylvania and Wisconsin.

The Setosus Associates are of widely diverse habit, from plants as erect as *R. allegheniensis* to those nearly as prostrate as *R. hispidus*. They may be variously grouped and keyed; but I desire to enumerate them together here as agreeing among themselves in the "setosus look", indicated by the low stature and usually decumbent or trailing old canes, the bristly stems (showing at least on young canes), more or less plicate appearance of leaves, seldom long-acuminate leaflets, short and slender-pedicelled usually bristly inflorescence, and small few-seeded little fruits.

a. Stems decumbent or prostrate, at least the second year.

b. Pedicels with few or no glandular hairs: leaflets of turions obovate to nearly orbicular, mostly short-acute: new canes arching and becoming prostrate.

39. **Rubus arcuans**, Fernald & St. John, Proc. Boston Soc. Nat. Hist. xxxvi, 78 (1921). Nova Scotia.

bb. Pedicels copiously glandular-hairy.

c. Prickles none or not flat-based.

d. Canes with few or not prominent glands or none.

e. New canes decumbent and tending to be prostrate, commonly more or less glandular but not prominently so: flowers and fruit very late.

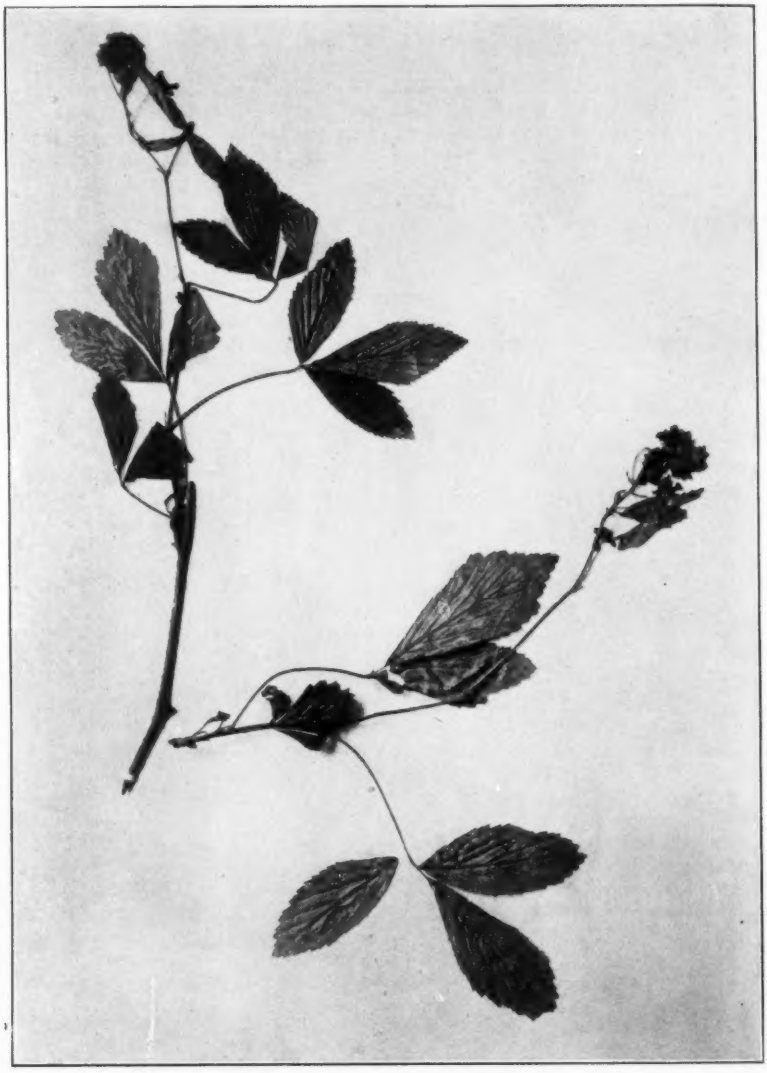

FIG. 80. A BIGELOW SPECIMEN OF *Rubus setosus*.

40. **Rubus tardatus**, Blanch. Rhodora, viii, 214 (1906). Maine, Nova Scotia.

ee. New canes weak, soft and erect, glandless.

41. **Rubus junceus**, Blanch. Rhodora, viii, 215 (1906). Maine, Nova Scotia.

dd. Canes with abundant glandular hairs of different lengths, recurving and mostly prostrate.

42. **Rubus permixtus,** Blanch. Torreya, vi, 117 (1906). Vermont and New Hampshire; reported from eastern New York and New Jersey. It has strong affiliations with *R. hispidus.*

cc. Prickles prominent and flat-based, with smaller ones intermixed: canes very glandular, becoming trailing: foliage dark lustrous green.

43. **Rubus biformispinus**, Blanch. Rhodora, viii, 178 (1906). Maine, Nova Scotia.

a. Stems erect.

b. Canes and branches essentially or completely glandless.

c. Inflorescence prominently bristly.

44. **Rubus Groutianus**, Blanch. Amer. Bot. x, 108 (1906). Vermont.

cc. Inflorescence usually without bristles.

45. **Rubus vermontanus,** Blanch. Amer. Bot. vii, 1 (1904).
R. peculiaris, Blanch. Rhodora, viii, 174 (1906), not *R. peculiaris*, Sampaio (1904). Vermont to Nova Scotia.
R. vermontanus var. *viridifolius*, Blanch. Amer. Bot. vii, 3 (1904) is a glandular plant. I have a separate of Blanchard's original description in which this plant is named var. *viridis.*

bb. Canes and branches (and petioles) moderately or densely glandular.

c. New canes and other parts pubescent.

46. **Rubus glandicaulis**, Blanch. Rhodora, viii, 172 (1906). Vermont to Nova Scotia.

cc. New canes not pubescent, and the plant mostly nearly glabrous except on young flowering shoots.

47. **Rubus abbrevians**, Blanch. Torreya, vi, 235 (1906). Vermont to Nova Scotia.

BB. *The non-bristly or non-hispid blackberries.*—Canes erect, often very tall, at least at first, sometimes arching over, somewhat scrambling but seldom really prostrate the second year or thereafter: inflorescence and flowers usually large: source of the cultivated blackberries. (B page 176).

C. *Canes biennial, erect or arching, or sometimes lopping the second year: prickles various or wanting, usually not thorn-like: foliage deciduous.*—The American high-bush blackberries. (CC page 194).

a. Foliage white- or gray-tomentose underneath: pedicels with prominent prickles: plants stiff and erect, of a grayish cast. *R. cuneifolius*

aa. Foliage not so: pedicels naked or only slightly armed: plants usually flexuose or at least not rigid.

b. Plant unarmed, or with only scattered weak and straightish prickles, without glandular hairiness. *R. canadensis*

bb. Plant strongly armed (except in one cultivated variety), with stout mostly curved prickles.

c. Inflorescence elongated, with continuous axis, and standing well out from the foliage, typically with prominent glandular hairs, the pedicels markedly divaricate. *R. allegheniensis*

cc. Inflorescence abbreviated, often leafy, nearly or quite glandless (exception in Frondosus Associates), some or all of the pedicels strongly ascending.

d. Leaves or leaflets of inflorescence and flowering-shoots acute or acuminate.

e. Leaflets on the narrow order (oblong-ovate or narrower) and gradually acuminate, evenly serrate: inflorescence short but little or not at all leafy: typically nearly or quite glabrous unless under surface of leaves and calyx. *R. argutus*

ee. Leaflets on the broad or short order, the terminal one on turions often cordate, coarsely unevenly toothed (if acuminate then cut-dentate): lower pedicels usually in axils of large leaf-blades, so that the cluster is leafy: plants often conspicuously pubescent, with a "soft" look. *R. frondosus*

dd. Leaves or leaflets of inflorescence and flowering-shoots conspicuously rounded at end, with variations toward short-acute. *R. floridus*

CUNEIFOLII

48. **Rubus cuneifolius**, Pursh, Fl. Amer. Sept. i, 347 (1814).
R. parvifolius, Walt. Fl. Car. 149 (1788) apud Pursh, not L.

This is the Sand blackberry, growing in dry lands from Connecticut to Florida and Louisiana. I have taken it over much of that territory. It is an erect very thorny half-evergreen bush, 1–3 feet or more high,—"a straggling briar of a gray aspect; the berries hard and dry", as Pursh writes. The white tomentum on the under surface of leaves, the small cuneate obovate leaflets with small close teeth on the upper half and the lower half tending to have a revolute margin, at once identify the plant. So far as I can determine, there is no type specimen extant. Pursh says it grows "in sandy fields and woods: New Jersey and Carolina". His description leaves no doubt as to what he meant.

Yet the plants that one must refer to *R. cuneifolius* in this extensive territory are not by any means homogeneous. There may be hybrids: but the aberrant plants are found in such a wide range and appear to have so many characters in common that, for purposes of identification, I think another species must be separated:

†49. **Rubus probabilis,** spec. nov. Fig. 81.
Planta, ut videtur, major et magis diffusa quam *R. cuneifolius:* caules glabri vel vix cinereo-pubescentes nisi apicem versus; aculei plerique validiores, basi magis dilatati et saepe magis arcuati et plerumque minoribus non immixtis: folio subtus minus albo-tomentosa; foliola majora, oblonga vel oblongo-ovata et vix non cuneata, breviter acuminata, majora 5–7 cm. longa, dentibus acutissimis et saepe magnis: fructus major; semina magna, distincte tessellata.

Southern blackberry, a much less white-tomentose and apparently larger more diffuse plant than *R. cuneifolius*, leaves not persistent; stems glabrous or scarcely cinereous-pubescent except toward tip; spines mostly stouter, broader-based and often more hooked, and commonly without smaller ones intermixed: leaflets larger and not cuneate-obovate but tapering to a point, coarsely and sharply serrate, sometimes doubly serrate, the fruit larger and juicy. As the type of what I mean, I take Blanchard's No. 63* from Gate City, Alabama, June 25, 1908, Fig. 81. The range of the species, so far as I can judge from available specimens, is North Carolina to Alabama and Florida. The plant should be looked for and good ranges of specimens obtained; material in herbaria is inadequate.

Many years ago I puzzled over the identity of the Tree and Topsy blackberries introduced by John Lewis Childs. I accepted the usual reference of them to *R. cuneifolius*, but always with reservations. At one time I tried to find a European origin. I do not at present have access to specimens of Topsy, and probably both varieties are now out of cultivation; but specimens of the Tree blackberry, as I grew it more than thirty years ago, are much like *R. probabilis*, as I now conceive that species (or group).

CANADENSES

50. **Rubus canadensis**, L. Sp. Pl. 494 (1753).
R. Millspaughii, Britt. Bull. Torr. Bot. Club, xviii, 366 (1891).
R. canadensis var. *Millspaughii*, Blanch., Bull. Torr. Bot. Club, xxxviii, 427 (1911), "a weak variety".

*Care must be exercised in citing Blanchard's numbers, for I find that the same number sometimes covers collections at different dates or places.

FIG. 81. PART OF A SHEET OF *Rubus probabilis*.

The name *R. canadensis* was applied to the common dewberry (*R. flagellaris*) until 1898 when I published my Sketch of the Evolution of our Native Fruits, for which I had examined the original specimens of Linnæus collected in Canada by Kalm. Fig. 82. It is indeed strange that this thornless blackberry should have been overlooked for some 140 years, until Britton described it again from specimens collected in West Virginia by C. F. Millspaugh, particularly as Linnæus says "caule inermi" and "foliola lanceolata". One of the difficulties in identifying the species is Linnæus' statement "foliis digitatis denis quinis ternatisque". Gray had apparently examined the Linnæan sheet, for the following remarks are made in Torrey & Gray, Flora of North America, i, 455: "The leaflets are frequently 5 in number, and are then narrower; but we have never observed as many as 7 or 10; neither are they to be found in Linnæus' specimen of *R. Canadensis*, which was erroneously described in this respect from the circumstance of two leaves overlying each other." This duplication is seen in Fig. 82; in the careful drawing made for me many years ago by John Allen and printed on page 383 of my Sketch the leaves are properly separated. For another interpretation of the Linnæan sheet, see Britton, Bull. Torr. Bot. Club, 1891, p. 366.

Rubus canadensis is the native thornless blackberry. It is a generalized species of wide distribution, reported from Newfoundland to Wisconsin and southward in the

FIG. 82. THE TYPE SPECIMEN OF *Rubus canadensis*.

mountains to North Carolina. In this great range it presents many aspects; varieties and subspecies could be readily separated, but it has characteristic features as a whole and they might be lost and the subject confused if close segregation were undertaken.

I have never seen *R. canadensis* in cultivation except in botanic gardens and trial grounds, transferred from the wild, although it is said that the Thornless Blackberries are of this species. The pomological thornless blackberries I know are three: *R. ulmifolius* var. *inermis*, page 197; a form of *R. recurvans*, page 191; Cory, page 156.

Three Canadensis Associates have been separated thus far, although the last two are none too closely related to this species:

a. Leaflets prevailingly ovate or oblong and long-taper-pointed: stem erect and woody, 2-4 feet. *R. elegantulus*

aa. Leaflets prevailingly obovate and long-taper-pointed: stem erect and woody, 3-5 feet. *R. amicalis*

aaa. Leaflets prevailingly oval to oblong, not long-taper-pointed: stems diffuse, weak and often nearly herbaceous, 1-2½ feet. *R. Randii*

51. **Rubus elegantulus**, Blanch. Rhodora, viii, 95 (1906).

An attractive blackberry of northern New England, but I am unable from the material I have seen to develop a clear conception of its limiting characters. I have seen no cultivated forms. Blanchard describes the fruit as "nearly globular, ¼–¾ inches in diameter, or on strong plants cylindric and larger, sweet, drupelets black and rather larger than those of *R. nigrobaccus*, Bailey".

R. multiformis, Blanch. Rhodora, viii, 179 (1906) suggests *R. elegantulus*, although more or less trailing, at least as to my specimens from him collected at Old Fort Inn, Kennebunkport, Maine (which is one of the type stations); other specimens so labelled by him and from his collection are apparently not the same thing. See page 170.

52. **Rubus amicalis,** Blanch. Rhodora, xiii, 56 (1911).
R. amabilis, Blanch. Rhodora, viii, 173 (1906), not Focke.

A robust plant described by Blanchard from southwestern Maine and by Rydberg credited also to Nova Scotia. I am not able to refer it to any other species. The fruit is small and variable; there are probably no cultivated forms.

53. **Rubus Randii,** Rydb. in Britt. Man. 497 (1901).
R. villosus var. *Randii*, Bailey in Rand & Redfield Fl. Mt. Desert, 94 (1894).
R. argutus var. *Randii*, Bailey, Sketch Evol. Nat. Fruits, 385 (1898).

I know of no way yet of treating this plant except to keep it distinct. I wrote it up as a good species for the Cyclopedia of American Horticulture, but it had been raised to specific rank by Rydberg before the fourth volume of the Cyclopedia was issued in February, 1902. From the type locality on Mt. Desert two sheets of specimens were made, one marked by me "type specimen" and sent to E. L. Rand after a photograph had been made, the other remaining with me; the former sheet is now in the Gray Herbarium, and it is shown in Fig. 83. I have another specimen from Mt. Desert and also specimens from Vermont; other specimens referred here are in doubt. A similar but not identical plant grows at Ithaca, N. Y. I suspect we will not consider it a tenable species when our Rubus flora shall have been collected.

ALLEGHENIENSES

54. **Rubus allegheniensis,** Porter, Bull. Torr. Bot. Club, xxiii, 153 (1896).
R. villosus var. *montanus*, Porter, l.c. xvii, 15 (1890).
R. montanus, Porter, l.c. xxi, 120 (1894), not Libert and others.
R. nigrobaccus, Bailey, Sketch Evol. Nat. Fruits, 379 (1898)

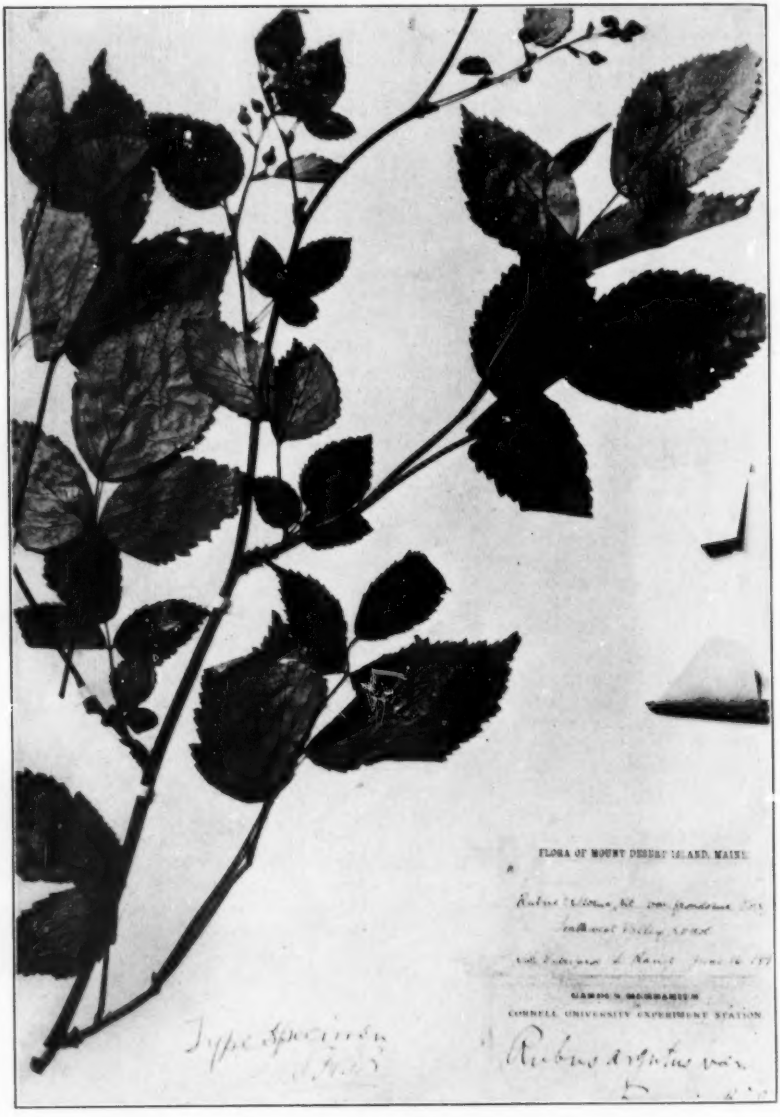

FIG. 83. TYPE SPECIMEN OF *Rubus Randii*.

R. nigrobaccatus, Focke, Bibl. Bot. heft 83[1], 313 (1914).*
R. villosus var. *sativus*, Bailey, Amer. Gard. xi, 719 (1890).
R. nigrobaccus var. *sativus*, Bailey, Sketch Evol. Nat. Fruits, 379 (1898).
R. sativus, Brainerd, Rhodora, ii, 26 (1900), at least as to synonymy.

The common high-bush blackberry of the eastern states, of both highlands and lowlands, known by its elongated inflorescence and glandular-villous covering. This species was known as *R. villosus*, Ait., until I examined Aiton's specimen at the British Museum and published on it in the Sketch in 1898. Before this time, however, the late T. C. Porter had separated the smaller mountain form as var. *montanus* and then as *R. allegheniensis*. "I have not had opportunity to examine this plant [mountain blackberry] in its native state", I wrote at that time (p. 370). "The herbarium specimens do not always seem to be distinct enough to warrant separation of the plant from the common high-bush blackberry, but since Professor Porter has studied the plant in its native state for many years, and insists in several publications upon its distinctness, I shall accept it as a distinct species. I am the more inclined to this opinion since if the common high-bush blackberry were to be united with the mountain blackberry, *Rubus allegheniensis* would have to be taken as the type of the species; and I should consider it unfortunate to take a mountain form as the type of a common continental plant". Therefore, I named the common high-bush blackberry *R. nigrobaccus*, remarking that in intermediate stations the two seem to intergrade. As we get the range and study the specimens, however, the supposed characters of separation vanish and the two must be merged.

Rubus allegheniensis has apparently entered largely into the American pomological blackberries. Probably we shall never know the botanical origin of many of these varieties. We must rely largely on surface indications. To the Allegheniensis I refer such kinds as Agawam, Ancient Briton, Early Cluster, Eldorado, Snyder, Taylor, without venturing an opinion as to what other species may have contributed to them.

The Allegheniensis Associates are perhaps three or four, although one of them is scarcely glandular; all are erect plants.

a. Inflorescence and shoots with prominent stalked glands.
  b. Raceme long and open like that of R. allegheniensis. *R. flavinanus*
  bb. Raceme short, leafy at base. *R. frondisentis*
aa. Inflorescence and shoots little if at all glandular. *R. pergratus*

55. **Rubus flavinanus,** Blanch. Amer. Bot. x, 69 (1906).

A dwarf blackberry (as known in the wild) in Vermont with the long glandular racemes of *R. allegheniensis*, prominently bracted, bearing many slender hooked or curved almost bristle-like prickles; fruit of only few drupelets.

56. **Rubus frondisentis,** Blanch. Torreya, vi, 119 (1906).

Plant 3–5 feet, stout, thickly beset with stalked glands in the inflorescence and between the numerous weak almost bristle-like prickles; racemes few-flowered, with small leaves at base; fruit small and cylindric. Vermont and New Hampshire.

57. **Rubus pergratus,** Blanch. Rhodora, viii, 96 (May, 1906).

Stout, 3–6 feet, nearly or quite glandless, with few short stout prickles, short rather close racemes; fruit short-cylindric, with large sweet drupelets; throughout New England, according to Brainerd and Peitersen, the fruit picked for market. I do not know how to separate *R. orarius*, Blanch. Rhodora, viii, 169 (Sept. 1906).

*Focke makes his name *nigrobaccatus* as a "nomen emend.", apparently on the supposition that *nigrobaccus* is an error and that the adjectival form *-baccatus* was intended. But the name is not an error. I had no intention of writing "black-berried Rubus", but "blackberry Rubus", putting the common English name into Latin as one would also say "blackberry bush". Others have indicated to me that the name should have been adjectival in form. If they do not like the present form, the name may be regarded as a noun in apposition and written with a capital N. But in botanical Latin, nouns are frequently used as an adjective as, for example, *longifolius, parvifolius*: *folium* is a noun and the classical adjectival form would be *-foliatus*. Objection may similarly be raised to *Brassica Napobrassica*, for which indeed, Prain has proposed the spelling *napobrassicata*.

ARGUTI

58. **Rubus argutus,** Link, Enum. ii, 60 (1822).

I would willingly eliminate the name *R. argutus* from the North American flora, but the original specimens cannot be ignored, and the diagnosis is good for those days:

"Caule aculeato aculeis retiutsculis, foliis ternatis et quinatis, foliolis oblongis acuminatis duplicato-argute serratis basi subattenuatis subtus pubescentibus, floribus pubescentibus. Hab. in America septentrionali. Caulis aculeis sparsis, parvis, hirtis. Folia subtus nervis pubescentibus. Calyces hirti. Cor. alba petalis basi attenuatis".

I saw these type specimens in Berlin in 1897, and made notes and a photograph. There are two sheets, taken from garden plants and apparently at the same time. These sheets are reproduced in Fig. 84, the one at the bottom being cut short but not losing any essential character. The specimens at Berlin have only obscurely angled stems, with few short slender straight or slightly curved prickles. The flowering shoots are pubescent but glandless. The leaves are nearly to quite glabrous above but pubescent on the veins beneath; petioles with few recurved prickles.

The original specimens, supplemented by the description, call for an only slightly pubescent plant with well separated prickles, narrow acuminate rather closely serrate leaflets (those on the turions often prominently acuminate), and with short-pubescent not glandular inflorescence on short flowering branches. I find such a plant ranging through the country from Virginia to Indiana, Missouri, Florida and Louisiana; and material from District of Columbia, Maryland and even farther north, is probably of the same species. The fruit is early, dryish and seedy, and usually dries reddish. Leaflets on the turions are often 5. The Early Harvest blackberry, which often winterkills in the North, is probably this species.

There are three or four rather clear Argutus Associates; the systematic position of all of them is in doubt.

59. **Rubus crux,** Ashe, Journ. Elisha Mitchell Sci. Soc. xix, 8 (1903), is regarded by its author as "related to *R. argutus,* Link, from which separated by its larger size, larger racemes and glabrous stems". I have examined material of this species and agree with the statement. Its relation to *R. argutus* is to be determined only by careful study of abundant collections. It was the intention of the author to make the name *trux,* and it is erroneously printed in the original description; on the separates distributed by the author the correction was made, but *crux* is regularly published and has passed into the literature and probably will stand.

60. **Rubus Andrewsianus,** Blanch. Rhodora, viii, 17 (1906).

I am unable to get a clear conception of this species. The extensive material I have from Blanchard contains more than one thing. He gives the range from Boston to the Gulf of Mexico; and Fernald (Rhodora, xxiii, 269) extends it to Nova Scotia. My specimens from Blanchard go west to Illinois and Arkansas and doubtfully to Minnesota. Some of the Blanchard material from the southern states is what I regard as good *R. argutus.* Whether we have a single species from Nova Scotia to the Gulf is open to question; the northern plant does not carry the narrow and long-acuminate leaflets, short floral shoots, widely separated spines and short ascending pedicels of the more southern plant, and it is more or less glandular. Blanchard says that *R. Andrewsianus* has "frequently a few stalked glands on the inflorescence"; Gray's Manual keys it out on "pedicels copiously glandular-pubescent". Blanchard never accepted *R. argutus,*— "the original specimens of which it is impossible to place with certainty, but which are probably from an intergrade between *R. allegheniensis* and *R. Andrewsianus,* since they have some of the distinguishing characters of each and certainly lack some of the most distinguishing ones of *R. Andrewsianus*". (Bull. Torr. Bot. Club, xxxviii, 429. 1911).

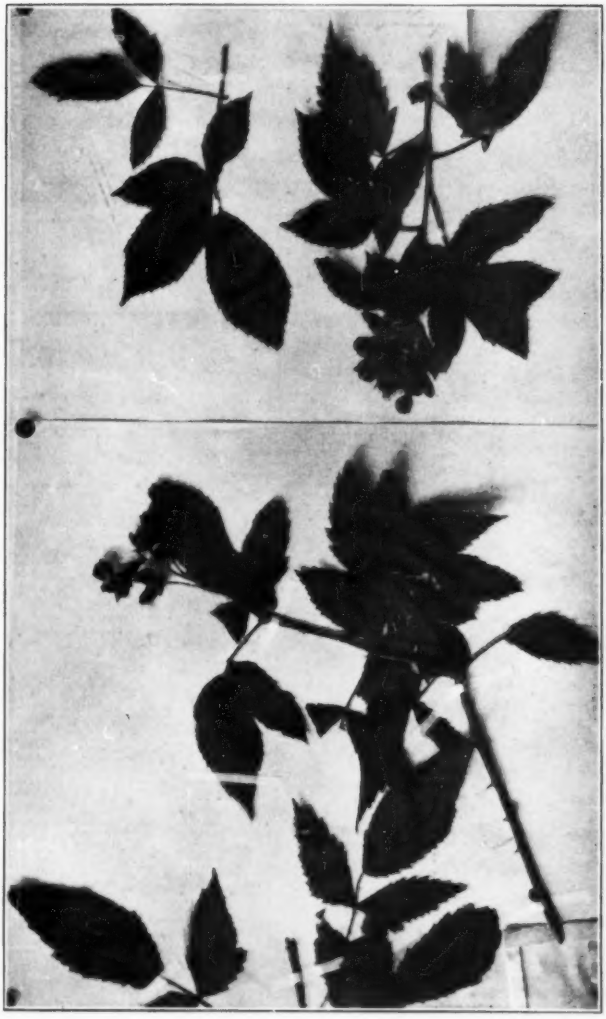

FIG. 84. LINK'S SPECIMENS OF *Rubus argutus*.

61. **Rubus floricomus**, Blanch. Amer. Bot. ix, 106 (1905).

A stout erect pubescent plant with abundant strong prickles on the order of *R. alleghenensis* but without the conspicuously glandular long racemes, and the leaflets as narrow and acuminate as in *R. argutus*.

Rubus ascendens, Blanch. Rhodora, ix, 9 (1907), I do not know. Blanchard says: "These characters and the general appearance of the new canes indicate the relationship of these plants to the high blackberries especially to small forms of *R. Andrewsianus*".

My present feeling is that the facts in the Arguti can be best expressed by accepting one species, *R. argutus*, with several varieties representing departures from type. This group constitutes a widespread family of high-bush blackberries, to be recognized as such and in need of separate study.

FRONDOSI

62. **Rubus frondosus,** Bigel. Fl. Bost. ed. 2, 199 (1824).
R. villosus var. *frondosus*, Torr. Fl. U. S. 1, 487 (1824).
R. philadelphicus, Blanch. Torreya, vii, 56 (1907).
R. Brainerdi, Rydb. N. Amer. Fl. xxii, 467 (1913), apud Brainerd & Peitersen Bull. 217, Vt. Exp. Sta. 31 (1920).

The Frondosus group presents one of the most interesting problems in North American Eubati. The limiting factors are not yet understood. Bigelow's species must be recognized. Blanchard in 1911 (Bull. Torr. Bot. Club, 434) gave its range "from Boston to Washington, in a strip bounded by the ocean on one side and a line marked by the following stations on the other side: Clinton, Mass.; Hartford, Conn.; Lancaster, Pa.; and Fairfax, Va. . . . The southern form, which is somewhat different from the northern, I described in Torreya 7: 55. 1907 as *R. philadelphicus*. I am by no means certain this separation should be given up." I have a specimen from him, however, named *R. frondosus*, collected by him at Dayton, Ohio and another at Bloomington, Indiana, 1908, which is two years after he had "resurrected this species from seeming oblivion". I have taken it near Pittston, Pennsylvania. Rydberg, Fl. N. Amer. 466, gives the range "Ontario to Rhode Island, Virginia, Kansas, and Iowa", and citing the type locality Roxbury, Massachusetts.

Blanchard called attention in 1906 to the authentic specimens of *R. frondosus* from Bigelow in the Torrey Herbarium (N. Y. Botanical Garden). There are two specimens on the sheet; the larger one is reproduced in Fig. 85. "It is to be distinguished at sight", he says, "from the other 'high bush' blackberries by its strong, round stem, abundant long recurving branches which touch and lie on the ground but do not appear to tip, leaves thick, roughly pubescent, leaflets very broad, the middle one only stalked. The old cane preserves its leaves till autumn the fruit ripening early and falling while all the leaves even on the inflorescence remain. The inflorescence is a close cyme with many of the pedicels subtended by broad leaves. No name could be more appropriate". (Rhodora, viii, 217). The original characterization by Bigelow is full and clear.

Four Frondosus Associates may be listed:

a. Stems strongly recurving, becoming almost prostrate: pedicels noticeably subtended by simple leaves: glandless. *R. Rossbergianus*

aa. Stems erect but at length usually more or less recurving: glandless.

b. Leaflets on flowering shoots strongly and irregularly cut-dentate, rather abruptly pointed. *R. recurvans*

bb. Leaflets serrate-dentate and long-acuminate. *R. amnicola*

aaa. Stems tall and strictly erect: usually prominently glandular. *R. alumnus*

63. **Rubus Rossbergianus,** Blanch. Rhodora, ix, 7 (1907).

Known only from Connecticut; probably not entitled to specific rank. Blanchard states that it "can be placed with the Recurvans class, and in appearance it is intermediate between *R. recurvans* and *R. procumbens*. It differs from *R. recurvans* in having thicker and dark green leaves, green stems, a more prostrate habit, and the rosette-shaped collection of unifoliolate leaves subtending the pedicels is very noticeable".

FIG. 85. A BIGELOW SPECIMEN OF *Rubus frondosus*.

64. **Rubus amnicola,** Blanch. Rhodora, viii, 170 (1906).*

Tall species with erect but recurving canes, Maine and Nova Scotia; leaflets on flowering shoots oblong to oblong-lanceolate, long-acuminate, the margins rather regularly serrate; inflorescence, under surface of leaves and usually the petiole villous-pubescent.

65. **Rubus recurvans,** Blanch. Rhodora, vi, 224 (1904).
R. arundelanus, Blanch. Rhodora, viii, 176 (1906).
R. Jeckylanus, Blanch. l.c. 177.

Considered broadly, *R. frondosus* may include this species, but I prefer to restrict *R. frondosus* to its characteristic features in the eastern part of the country. Blanchard gives the range of *R. recurvans* (Bull. Torr. Bot. Club, xxxviii, 434) as "western Maine to Iowa", which Fernald extends to Nova Scotia. It is a widespread generalized type. It is frequent about Ithaca, New York; thirty years ago I made a diagnosis and gave it a name but never published the name. Blanchard records "a noticeable resemblance to the common running blackberry". I had noted the resemblance to the dewberry, and finally recorded it as *R. nigrobaccus* × *R. villosus* (Sketch Evol. Nat. Fruits, 381, figs. 66, 67. 1898; Card, Bush-Fruits, 324, 1898). I regarded *R. heterophyllus,* Willd. to be referable here (see Card, l.c. 325); but this name is of such doubtful application that I have not felt like using it (see p. 162).

FIG. 86. LIVING SPECIMEN OF *Rubus recurvans.*

*See note, page 167.

Rubus recurvans is so widespread and occurs so independently of *R. allegheniensis* and *R. flagellaris* that I now accept the species, although some of the material passing under this name may represent actual contemporaneous hybrids. I conceive the species to be broad enough to cover Blanchard's *R. arundelanus* and *R. Jeckylanus*, the latter, according to Brainerd and Peitersen "named after a fictitious person who lived a double life in a well-known story of Stevenson". The species *R. recurvans*, as combined, is various enough to justify the courtesy to Stevenson, but I am unable to divide it with any useful results. In the bundle of *R. arundelanus* that came to me in the Blanchard collections, some of the folders were marked both "arundelanus" and "Jeckylanus".

Rubus recurvans has strong recurving or arching canes on large plants in good soil, but it is usually stiffly erect and dwarf in dry open fields. It is a soft-pubescent but glandless plant with short leafy clusters, distinguished by the acuminate and sharply cut-toothed or even jagged leaves of the flowering branches. Fig. 86 shows the plant as it grows in dry places at Ithaca, New York.

To the Frondosus-Recurvans group belong some of the most important pomological blackberries, perhaps hybridized with Allegheniensis and others. One must be cautious in referring cultivated varieties to botanical sources because varieties in plantations may not be true to name. This fact may account for some of the diversity of opinion as to botanical status. Varieties of this relationship are Blowers, probably Erie, Kittatinny, Mersereau, Miller, Minnewaski, Ohmer, Perfection, Tory, Thornless (see also p. 197). The Lawton, which first gave American blackberry culture its standing, is also of this Frondosus-Recurvans series if one may judge by early descriptions and portraits; and the variety still grown in California under this name seems to verify this conclusion. In The Horticulturist for May, 1853, is an account taken from the Agriculter of the American Institute Farmers' Club, in which Mr. Lawton says that one of his neighbors "discovered, some six or eight years ago, a bunch of blackberry vines by the side of the road, of different quality from the common high blackberry, and so much superior that he was induced to transfer it to his garden." The berry is figured in the issue for October 1854, and the portrait is reproduced, half size, in Fig. 87.

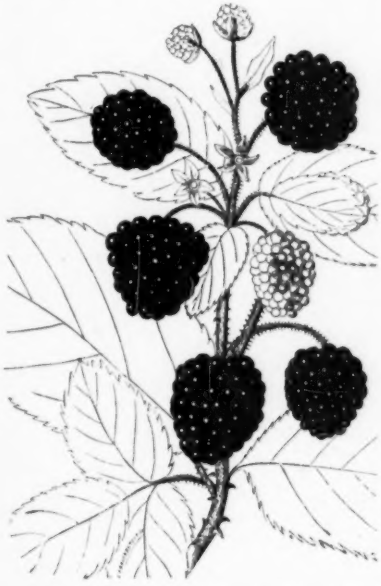

FIG. 87. THE LAWTON BLACKBERRY AS PICTURED IN "THE HORTICULTURIST" FOR 1854.

†66. **Rubus alumnus,** spec. nov. Fig. 88.

Species Frondosorum, sed ob pilos glandulosos ad Allegheniense accedens; erectus, plerumque 2 m. altus, turionibus nec recurvantibus nec prostratis foliosissimis; turiones angulati, aciculis basi applanatis validis rectis vel leviter curvatis armati, juveniles pubescentes et plerique glandulosi: folia 3-5-foliolata, supra leviter pubescentia, subtus molliter pubescentia, pleraque petiolo manifeste aculeato et glandulis stipitatis paucis instructo, costis magis minusve aciculis parvis obsitis, foliolo terminali manifeste petiolulato; foliola late

elliptico-ovata, acuta vel breviter acuminata, margine grossius duplicato-serrata, terminale 8–12 cm. longum : inflorescentia plerumque valde in foliis immersa, 8–12 cm. longa, folia plura simplicia vel ternata laminis oblongis gerens, villosa et plerumque crebre glanduloso-pilosa; pedicelli inferiores remoti, longi, manifeste ascendentes, superiores approximati, breviores, leviter patentes: flores permagni, 3–4 cm. diametientes, petalis latis obtusis: fructus magnus, saepe 30–35 mm. longus et 18 mm. crassus, dulcissimus.

Western Missouri and probably elsewhere. B. F. Bush, who provides me with excellent material, says that in Jackson County, Missouri, "it is the chief berry of the wild market berries, is much gathered and sold, and is very commonly taken up and transplanted in gardens. It is the tall blackberry of rich open woods, or sometimes on the prairies, but it is not a prairie species".

I place this interesting plant in the Frondosi because of its leafy flower-clusters without the elongated rachis and divaricate pedicels of *R. allegheniensis*, and very large flowers, although its glandular character associates it with the latter species. The very leafy nature of the plant is striking, the clusters often seeming to be buried in the foliage. The leaflets are broader and usually less attenuate-acuminate than those of *R. allegheniensis*.

Mr. Bush sends me *R. allegheniensis* from the same region. This is a lower plant, "and a prairie species distinctly. It produces many fruits on the stem, and the fruits are much smaller, about one-half the size of the other, and are very acid". The clusters of this *allegheniensis* are very compact and the flowers small; it may be a marked geographical race. From the same region he also sends me abundant *R. flagellaris* var. *invisus*.

Rubus alumnus is erect, mostly 6 feet and more tall, without prostrate canes, very leafy: canes angled, with flat-based not closely placed straight or somewhat curved strong prickles, the young growths pubescent and usually bearing glandular hairs: leaves 3-5-foliolate, lightly hairy above, soft-pubescent beneath, mostly with strongly prickly petiole which also bears a few stalked glands, the midribs more or less small-prickly, terminal leaflet prominently stalked; leaflets broadly elliptic-ovate, acute or short-acuminate, the terminal one about 3–5 inches long, margins rather coarsely double-serrate: inflorescence mostly prominently involved in the foliage, 3–6 inches long, containing several simple or ternate leaves with oblong blades, the lower pedicels remote, long and strongly ascending, the upper ones proximate, shorter and somewhat spreading, the parts shaggy-pubescent and usually freely glandular-hairy: flowers very large, 1¼-1½ inches across, the petals broad and obtuse: fruit large, often 1¼ to nearly 1½ inches long and about ¾ inch thick, very sweet.

FLORIDI

67. **Rubus floridus,** Tratt. Ros. Monogr. 3, 73 (1823).

R. argutus var. *floridus*, Bailey, Sketch Evol. Nat. Fruits, 385 (1898).
R. rhodophyllus, Rydb. in Small, Fl. Southeast. U. S. 518 (1903). (Tracy 4107: Small, p. 1331. Some of the distribution was of lateral branches that look like prostrate canes).
R. persistens, Rydb in Small, l.c. 519 (Tracy 4108: Small, p. 1331).

If too much is not included, this species appears to be clear. My specimens are from South Carolina, Tennessee, Georgia, Alabama and Mississippi. I do not know where Enslen collected, on whose plants Trattinick founded the species, but have assumed from different considerations that it must have been far South. I have not seen the type specimen, which is in Vienna, but I have a photograph of it (Fig. 89), together with a detailed reconstruction made for me many years ago through the kindness of Professor Dr. Beck and which was published, without the separate details, in my Sketch in 1898 and here again shown in Fig. 90. It is a stiff hard-leaved plant with strong curved prickles. The small broad not acuminate and often obtuse coarsely serrate floral leaflets,

FIG. 88. REPRESENTATIVE FLOWERING SHOOT OF *Rubus alumnus*.

elliptic more or less acute but not acuminate leaflets of turions which are 3 rather than 5, short few-flowered clusters, large corolla, hairy-pubescent often slightly glandular pedicels and petioles, and gray-hairy under surfaces of leaves sufficiently distinguish it. Sometimes the flowers are pink. The plant is erect and reported to grow 8 to 10 feet high and somewhat climbing in low woodlands and swamps and, what I take to be the same, 3 to 4 feet in sandy fields. I suspect that we shall recognize this plant as a rather generalized type in the southern states, with considerable variation. It has been confused with *R. argutus*, for which I am no doubt partly responsible, but the distinctions are ample.

68. **Rubus betulifolius,** Small, Fl. Southeast. U. S. 518 (1903).

A slender thinner-leaved plant than *R. floridus*, marked particularly by the presence in the inflorescence of small simple short-ovate often cordate petioled Betula-like leaves: leaflets on turions narrow, notch-toothed. Swamps, Alabama, 8–10 feet; perhaps an outlying form of *R. floridus*.

FIG. 89. TYPE SPECIMEN OF *Rubus floridus*.

I have a related plant from Georgia that appears to be new; more material is awaited.

FRUTICOSI

CC. *Canes very woody, usually of several year's duration, becoming more or less trailing or scrambling: thorns, when present, very stout and large: foliage persistent: Old World species.* (C page 179).

There are more exotic Rubi in this countrty than we are aware. Some of them apparently are becoming naturalized. I have already mentioned *R. cæsius* (page 153). A few others I am now listing, and I know that there are more. I suspect that *R. multispinus*, Blanch. Torreya, vii, 7 (1907) is an introduction. All the specimens I have seen of it show only short lateral inflorescences, and I therefore do not know how far the terminal clusters would go toward placing it definitely. The circumstances under which Blanchard found it in Rhode Island and Massachusetts suggest an adventive plant. The pieces I have seen suggest the European *R. montanus* or similar relationship. Blanchard speaks of it as "fearfully armed and well branched. The canes are 4–8 feet long, nearly erect at first, soon decumbent and partly trailing, with numerous long branches, glandless but slightly pubescent, none noticed tipping". Bicknell considers this plant to be *R. frondosus* × *procumbens* (Bull. Torr. Bot. Club, xxxviii, 121), and Rydberg thinks it *R. argutus* × *procumbens* (N. Amer. Fl. xxii, 475). Brainerd & Peitersen think it *R. argutus* × *flagellaris* (Bull. 217, 73).

FIG. 90. RECONSTRUCTION OF *Rubus floridus*.

a. Prickles present and prominent.
b. Leaflets cut into narrow divisions. *R. laciniatus*
bb. Leaflets often more or less lobed, but not cut.
c. Stems densely hairy or even felted, usually with a few stalked glands. *R. leucostachys*
cc. Stems not hairy or only thinly so, although perhaps puberulent, glands absent.
d. Under side of leaves white-tomentose. *R. procerus*
dd. Under surface not so, although pubescent. *R. macrophyllus* var.
aa. Prickles wanting. *R. ulmifolius* var.

69. **Rubus laciniatus,** Willd. Hort. Berol. t. 82 (1807).
R. vulgaris var. *laciniatus*, Dipp. Handb. Laubh. iii, 529 (1893).

The Cut-leaved or Evergreen blackberry is probably of mutation origin in Europe from *R. vulgaris*, Weihe & Nees. It is a vigorous persistent plant now widespread over the world and so much at home as to be regarded as native in many places.

This Rubus is known mostly as an ornamental subject, but it often bears good fruit and has been introduced as Oregon Everbearing blackberry, and also in the pomological names Atlantic, Starr, Wonder.

70. **Rubus leucostachys,** Schleich. in Smith Engl. Fl. ii, 403 (1824).

A climbing or arching-prostrate plant with densely hairy or felted and usually sparingly glandular stems: leaves yellowish or grayish beneath with a felted or hairy covering: inflorescence a long cylindrical panicle: fruit juicy, sweet and mawkish. Specimens of this species are sent me by J. C. Nelson, Salem, Oregon, as growing on a "dry bank along Oregon Electric Ry.", and I have it from the Experiment Station, Puyallup, Washington. It is native, according to William Moyle Rogers, in Great Britain and western continental Europe.

71. **Rubus procerus,** P. J. Muell, in Boul. Ronc. Vosg. 7 (1864).
R. macrostemon, Focke, Syn. Rub. Germ. 193 (1877).
R. hedycarpus, Focke, subsp. *macrostemon*, Focke, Bibl. Bot. heft 83^{II}, 162 (1914).

Here I now place the plant grown in this country and England as the Himalayaberry and Giant Himalaya. There is no botanical evidence to show that it belongs to the Himalayan region while there is every probability that it does not, although it may have found its way there from Europe as a cultivated subject. Bunyard states (in Gardeners' Chronicle for Nov. 23, 1918, p. 205) that the Himalayaberry is identical with the German variety Theodore Reimers.

The Himalayaberry is a plant of great vigor and viciously thorny, producing stout woody canes 20–40 feet long that become decumbent, trailing or scandent and which in cultivation are often tied to stakes or trellises. The young growths are white-tomentose, but the old canes become glabrous: spines very stout, flat-based, hooked or declined: leaves thick, persistent, white-tomentose beneath, above lightly hairy on rib and main veins, petioles and petiolules with hooked prickles; leaflets 5, becoming 3 toward the end of the canes, broadly elliptic-ovate, strongly and sharply somewhat doubly serrate: flowers 1 inch across, with many very large stamens, white, in panicled white-tomentose prickly glandless cymes: fruit black, firm, thimble-shaped, of fair quality, ripening from midsummer to autumn.

The Himalayaberry has been provisionally identified in this country with *R. thyrsanthus*, Focke, but this reference will not hold. The Late R. A. Rolfe, at Kew, who gave much attention to Rubus, made a study of the Himalayaberry, and his conclusions are published in The Gardeners' Chronicle for Jan. 18, 1919, p. 27. At one time I took specimens to him of the plant as grown in North America, and they proved to be identical with those cultivated in England. Rolfe thinks that the plant is "a hybrid derivative" of *R. incarnatus*, P. J. Muell., which is regarded by Focke as a variety of *R. villicaulis*,

Koehler, a variable European species, the variety being marked, among other things, by leaves "subtus cano- vel albo-tomentosa". Subsequently Dr. Otto Stapf, Keeper of the Herbarium at Kew, wrote me that he finds the Himalayaberry "a very near match" of specimens of *R. macrostemon*, Focke and *R. praecox*, Bertol. These plants are referred by Focke to his collective species *R. hedycarpus*. Stapf would "therefore place the Himalayaberry rather in *R. hedycarpus* than in *R. villicaulis*, but if it is a hybrid it may have something of both". The plant also strongly resembles forms of *R. pubescens*, Weihe.*

I have *R. macrostemon*, Focke, as distributed in Baenitz, Herbarium Dendrologicum, "teste Focke", and the Himalayaberry does not differ from it. I prefer, however, to accept Sudre's disposition of *R. macrostemon* (Rubi Europæ, 87, t. 91) as a synonym of *R. procerus*, P. J. Muell. Whether the Himalayaberry may differ from typical *R. procerus* in horticultural or other characters, whether in fact a mutant or hybrid, worthy of separate designation is a question for future observation to determine. It would be advantageous if the Himalayaberry had a binomial of its own, but this section of Rubus has undergone such a degree of refinement that one could hardly draw a diagnosis or even make a portrait that would distinguish it; and I therefore let it rest here until it has been more closely resolved by European batologists.

I have specimens from California under the name of Himalayaberry which belong with the Recurvans lot; whether there are two things grown under this name or whether field labels became misplaced I do not know, but I suspect the latter.

72. **Rubus macrophyllus,** Wh. & N., var. **amplificatus,** Bab. Brit. Rubi, 153 (1869). *R. amplificatus*, Lees, in Steele, Handb. Field Bot. 58 (1847).

A strong evergreen much-branched blackberry somewhat introduced into this country from England for ornamental planting: canes long and stout, angled, lightly pubescent to glabrous, bearing very stout broad-based hooked prickles: leaves thick, mostly 5-foliolate, glabrescent above and pubescent beneath, irregularly double-serrate or incised; leaflets oval to elliptic-ovate, often large, acuminate: fls. white in a rather long pubescent and prickly panicle of which the lower branches are long.

73. **Rubus ulmifolius,** Schott, var. **inermis,** Focke, Bibl. Bot. heft 83^{II}, 154 (1914). *R. inermis*, Willd. Enum. Hort. Berol. i, 548 (1809).

The blackberry now in cultivation with us as Evergreen and Burbank Thornless belongs here. The species is European. Willdenow records his *R. inermis* from North America and our botanists were long puzzled by it, usually supposing it to be a spineless form of *R. villosus* (*R. alleghensis*). I saw his specimen at Berlin in 1897 and photographed it, and made reference of it to *R. ulmifolius* (Sketch Evol. Nat. Fruits, 367), removing it from the North American flora. (See p. 162) It now comes to us as a cultivated plant; and it would be interesting to know whether it happened to be in this country as an immigrant in Willdenow's time and was actually received from here.

Other Rubi

Double-flowered blackberries of European origin now and then appear in collections, sometimes as escapes, but I do not know that any of them are established as cultivated plants in this country. They are likely to be forms of *R. rusticanus*, Merc. (*R. discolor*, Authors), but the identity can be established only with good specimens. It is to such plants that the name *R. Linkianus* has been applied in this country. The identity of *R. Linkianus*, Ser. in DC Prodr. ii, 560, is difficult to make out. I have not been able to find any type specimen in the European herbaria. DeCandolle says that the nativity

*This species, *R. pubescens*, Weihe, 1824, is antedated by *R. pubescens*, Raf. (1811) which is now adopted for *R. triflorus*. Richards.; this requires that the Europeans bring up some other name for their *R. pubescens*.

is unknown and that the flowers are double; but different Rubi produce double flowers. The synonomy indicates that it is *R. paniculatus*, Schlecht. which is antedated by *R. paniculatus*, Smith. Focke refers *R. Linkianus* to the collective species *R. thyrsoideus*, Wimm., under his subspecies *R. thyrsanthus*, "formae R. thyrsantho affines". Sudre places it under the collective species *R. arduennensis*, Libert, with the following statement: "une plante culturale de patrie inconnue et naturalisée sur un grand nombre de points. C'est peut-être un hybride de la forme *R. procerus* var. *robustus* × *tomentosus Lloydianus*". *R. Linkianus* may well be dropped as a species from the American flora.

Other European Rubi of the *R. fruticosus* series are in North America but I do not know how well they may be established. Seeing that the *R. fruticosus* of Linnæus is divided into about 100 species and many varieties in Great Britain alone (see William Moyle Rogers, "Handbook of British Rubi"), one hesitates to be positive on random introductions, particularly when specimens are incomplete.

Various hybrids involving extra-American species are in the country. One is the Mahdi, cross between Fontenay raspberry (*Rubus idæus*) and "the common blackberry" of England (Fig. 3486, Stand. Cyclo. Hort.) The late R. A. Rolfe, who had given attention to the plant, notes on my specimens from England that the English blackberry in this cross is probably *R. rusticanus*. Hedrick writes (Cyclopedia of Hardy Fruits) that it is of little value at Geneva, N. Y.

Other English hybrids that seem not to be promising in this country, although tried here, are lowberry, said to be a cross between blackberry and loganberry; and laxtonberry, recorded as a cross between loganberry and Superlative red raspberry.

Blackberry-raspberry crosses have thus far yielded little of promise to the pomologist. E. S. Carman had made such crosses at his interesting place in New Jersey more than thirty years ago. Yet the possibilities in Rubus crosses are little developed, and another generation is likely to have many interesting novelties. Those interested in this subject will familiarize themselves with the work of Ness (page 169), of Detjen ("Self-sterility in dewberries and blackberries", Tech. Bull. 11, N. Car. Exper. Sta; Journ. Heredity, Feb. 1920), and others.

Rubi of the Far East may contribute a part to small-fruit culture. Several species of Japan and China are now in cultivation in North America. The Van Fleet raspberry recently named by the U. S. Department of Agriculture in memory of Dr. Walter Van Fleet, is a cross of the Chinese *Rubus innominatus*, Moore × Cuthbert raspberry.

Strange new specific types will come to us, as witness *Rubus Macraei*, Gray, the Akala of Hawaii (Rock, Journ. Heredity, Apr. 1921); the giant blackberry of Colombia, probably *Rubus roseus*, Poir. (Popenoe, Journ. Heredity, May-June, 1920).

With these prospects, it is specially incumbent on us to be well grounded in the systematic botany of the genus before we mix things up.

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